An electronic survey of preferred podcast format and content requirements among trainee Emergency Medicine specialists in four Southern African Universities

by

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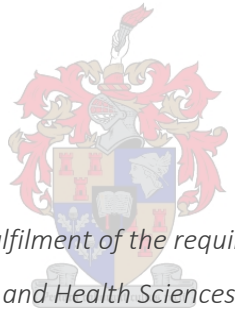
Division of Emergency Medicine



Research assignment presented in partial fulfilment of the requirements for the degree Masters of Medicine in the Faculty of Medicine and Health Sciences at Stellenbosch University

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Declaration

By submitting this research assignment electronically, I, *Kamlin Ekambaram* declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: December 2020

List of Abbreviations

CD-ROM ..... Compact disc read-only memory
CME ..... Continuous Medical Education
ED ..... Emergency Department
EM ..... Emergency Medicine
EMCT ..... Emergency Medicine Cape Town
FCEM-SA ..... Faculty of the Colledge of Medicine South Africa
FOAMed ..... Free Open-Access Medical Education
JIF ..... Journal Impact Factor
JiTT ..... Just-in-Time Teaching
kb/s ..... Kilobytes per second
mb ..... Megabytes
MMed ..... Masters of Medicine
MP3 ..... MPEG Layer
MPEG ..... The Moving Picture Experts Group
PDF ..... Portable Document Format
PSA ..... Procedural Sedation-Analgesia
SMi ..... Social Media Index
SU ..... University of Stellenbosch
UB ..... University of Botswana
UCT ..... University of Cape Town
UP ..... University of Pretoria
USA ..... United States of America

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Part A: Literature Review

Background

Podcasting in Emergency Medicine (EM) is proliferating in both production and consumption in the current age of technology and social media [1]. However, its questionable influence on current university curricula, as well the educational benefits and potential downsides of podcasting in EM have not been well documented [2].

This review serves to examine current literature regarding the podcast-usage trends of training EM specialists by examining the parallel origins and development of medical education and information technology; a partnership that led to the field of online medical education and, ultimately, podcasting in EM.

Methods

This review comprises two sections:

- Section A – a brief review on the history and development of online medical education and the technology that supports/facilitates it
- Section B – a deeper dive into the specific role that educational podcasts play in the medical subspeciality of Emergency Medicine.

For *Section A* we conducted a semi-structured review from a wide variety of sources including popular internet search engines, online newspaper articles, company product pages and scholarly articles. Our initial search terms included ("Medical Education" OR "Technology" OR "Online Education" OR "Podcast" OR "Medical Podcast" OR "Educational Podcast") but was later refined and guided by results of preceding searches.

For *Section B* we searched the medical literature using common databases: MEDLINE, Science Direct, and SCOPUS in combination with Google Scholar. The initial search-string used was (("Podcast" OR "audio-blog" OR "Podcasting") AND ("Emergency Medicine") AND ("trainee" OR "registrar" OR "resident")). Additionally, we conducted a review of references from included articles in conjunction with alternate search strategies to augment the pool of relevant literature. The resulting articles were included if they reported the presence of a podcast in emergency medicine, the study population included registrars, and they were published in English. Papers were initially excluded upon review of their title and abstracts. A second round of articles were excluded upon review of the full text. Data extraction methodology was applied to the remaining papers (Appendix).

Section A – Online Medical Education

Origins of Medical Education

The changing zeitgeist of medicine, in concert with the progression of civilisation, has led to the evolution of medical education over the centuries.

The earlier, limited sharing of the insights of Charaka around 500 B.C on the practice of Ayurveda in Sanskrit medical texts, and the translation of Greek and Arabic manuscripts by Constantine in the 10th century, transitioned to the establishment of Universities with formal, centralised teachings during the 16th-17th centuries [3,4]. These transformations endeavoured to serve the needs of populations that were both continuously growing and ageing - gaining in medical complexity.

The 21st century heralded the present era of electronic-learning and social media, inducing the metamorphosis of medical education; from the static and linear sharing of information into more dynamic, decentralised and agile methods of education [5].

Information Technology and Medical Education

Technology has impacted the face of medicine through two main avenues – playing a role in the advancement of medical education and in supporting healthcare itself [5]. The general advancement of medical education is dependent upon the availability and access to medical knowledge which, in turn, is commensurate with the available technology supporting the sharing of information. Subsequently, we can infer that the progression of medical education is precluded, to some degree, by the advancements in information technology; as seen by a trend from printed textbooks and didactic lectures into blog posts and podcasts [6].

During the initial phases of the internet, students were mainly limited by data-transfer speeds. Tamm et al. [7] noted the challenges in using 33.6 kilobytes per second (kb/s) dial modems, which limited the size of digital-audio files that could reliably be distributed over the internet to 1.5 megabytes (mb), when attempting to combine static radiology images with audio for lectures. It became apparent that widespread adoption of information technology in education would require two main things: faster transfer speeds, and smaller file sizes.

Digital audio-compression

The desire to store and disseminate media to reach a global market was not unique to education, being initially explored by the entertainment industry [8]. Built and based upon a series of advancements into the physics of sound and frequencies inaudible to humans, the concept of ‘lossy audio’ sparked research and development into digital audio compression – culminating in the creation of the popular MPEG Layer 3 (MP3) digital-audio file format [9–11].

Utilising this form of compression, it became possible to fit an entire song onto a single floppy disc, and then multiple onto a CD-ROM (compact disc read-only memory) [12]. For medical trainees, and the general population alike, this paved the way for easier access to multimedia content.

Portable Digital-Audio File Players

Although neither the first nor the last to do so, Apple's widely popular iPod improved portability in the world of recorded audio – adding to the already-enticing digitisation age [13,14]. Apple's first iPod, released in 2001, boasted a 5-gigabyte hard drive for storage of music [15]. Like many other MP3 players of its time, the first-generation iPod could store and play multiple digital-audio formats. With these conveniently pocket-sized devices, users could not only store thousands of compressed audio files, but also listen in crisp, near-lossless audio quality wherever they were.

These developments would serve to kindle the industry of podcasting, catalysed by a market primed for the easily consumable sharing of information and perpetuated by ongoing innovations in the world wide web (Web 2.0); spawning the commensurable relationship between the industry of podcasts and medical education.

Online Education

The appeal of using the internet for education by students (online learning) includes a reduction in costs such as commuting and accommodation, an increase in the flexibility of time and commitments and the opportunity to easily access and network with colleagues beyond country and continental barriers [16].

Online education can be divided into two categories: synchronous and asynchronous learning [17]. Synchronous electronic learning (e-learning) is a form of education where the instructor, trainee and classmates interact with each other, at the same time, in a shared online space. Contrastingly, asynchronous e-learning may take place at any time, through a variety of online channels, and does not require direct interaction between participants.

Asynchronous Education in Medicine

In the ensuing technological age, asynchronous platforms of learning in medical education would begin to thrive; born of the necessity to resolve the disparity between the growing demands of clinical medicine and the methods of traditional medical education [18]. Didactic lectures and the structured, unidirectional, communication of knowledge were always destined to fall short of fulfilling the demands placed upon students by the relentless pace required to grow their expertise to satisfactorily engage with growing curricula [19].

This perceived knowledge-translation gap created a niche for asynchronous learning, which trainees could inquire into and utilise as an educational supplement, running independently of their structured syllabus.

Perhaps the earliest record of asynchronous digital medical education is in the 1960s when general practitioners used recorded didactic lectures as continuing medical education (CME) [20]. More recently, a study of EM trainees in California confirmed non-inferiority on their in-training exam scores when 25% of their didactic, synchronous-education time was replaced with an asynchronous curriculum [21]. Ultimately, social media – and its exponential growth during the age of information technology – would further cement the role of asynchronous learning in medical education [22].

The Free Open-Access Medical Education movement (FOAMed)

Another resource serving as an important lure to medical students is the Free Open-Access Medical education (FOAMed) movement [23]. Primarily spearheaded by clinicians motivated by their frustration with the vast translation gap between emerging medical knowledge and clinical practice, this movement provided a useful adjunct to traditional medical teachings. Medical education was transitioning; from a primarily institution-driven, instructional, didactic teaching format, into something more decentralised, personal, and democratic.

FOAMed resources are more accessible and portable than their traditional counterparts, allowing trainees to educate themselves using resources immediately available, and best suited to their real-time needs; depending upon their ability to engage with social media. The FOAMed bouquet is seemingly limitless, and while some resources contain mainly text, images and animations (viz. Blog sites, Twitter feeds, online textbooks and Facebook pages), other resources rely heavily on the use of multimedia (viz. YouTube channels and Podcast shows) [24–26].

Podcasts

The word *podcast* – a portmanteau coined by Ben Hammersley [27] – refers to recorded digital-audio segments, made available episodically, for download or live-streaming. Podcasting neither requires an 'iPod' nor 'broadcasting', although stemming from these root words. Other less popular words encompassing the concept of podcasts include blog-casting, audiocasting and audio-blogging [27].

The podcasting continuum can be separated into production and consumption. Educational podcasts are typically recorded by the podcaster (podcast creator) in a suitable environment, undergo editing and processing, uploaded to an internet service where they are hosted after being tagged with metadata for Really Simple Syndication (RSS) feeds, and then submitted to a streaming service where they are distributed.

Users are then able to browse these streaming services via the web or a smartphone app, and select podcasts by show, episode, content, or producers (Figure 1).

Figure 1 Basic schematic of the social-podcasting-continuum. **1.** Podcaster records and processes audio using appropriate hardware and software **2.** The podcast is tagged with metadata and uploaded to hosting service(s). An RSS feed is generated and, together with the podcast, is uploaded to the internet **3.** The podcast metadata is made available to podcast cataloguing sites (such as Apple Podcasts, Spotify, SoundCloud). Links are generated and shared or embedded, in multiple social networking platforms (such as Reddit, Twitter, Facebook, WhatsApp) **4.** Podcasts are downloaded or streamed onto a user device via a suitable podcast supporting application(s) **5.** Users can access podcasts, as well as other social networking platforms, to engage with other users and podcast creators, by participating in discussions and providing feedback **6.** Podcast creators can engage via the same social network platforms, as users themselves, and engage with consumers and other podcast or FOAMed creators

Podcast shows are akin to a television series and may contain multiple podcast episodes. Videocasts are like podcasts – with episodes in a video format instead of purely audio [28,29]. The popularity of the video streaming service, YouTube (Google inc.), is a prime example a preference toward multimedia podcasts – some evidence suggesting that exposing medical trainees to instructional videos improved their procedural techniques [30].

Podcasting in Medicine

Podcasts, as medical resource, were generated – and in-use – before social media platforms were adopted *en masse* [31].

The first generation of medical podcasts were used predominantly by major medical journals to provide content – ranging from issue summaries to news, marketing, and interviews with authors of included papers – to current and potential journal subscribers [32]. The episodic nature of podcasts lent itself well to the issue releases from these journals. This initial form of podcasting was seen as static – due to the lack of interactivity between podcaster and listener – and as a result, medical educationalists began to explore the use of podcasts to deliver recorded didactic lectures to their students via online platforms [33].

With the coordination and coverage afforded by social networking platforms coupled with the growing internet community, the role of podcasting in medicine would fundamentally alter; its original function of marketing medical journals evolving into a second generation of podcasts that promise more independent, and autonomous, methods for *de novo* medical education [34,35].

Generational Learners and their Learning Styles

In 2020, the typical postgraduate EM trainee belongs to Generation Y (Born 1981 – 1996, also known as millennials) [39,40]. Being born into an era of information technology, with constant exposure to its influences and benefits throughout their lives, Alison Black [41], a leading educationalist, suggests that millennials have been primed to expect fast-paced solutions and explanations on-demand. Consequently, millennials find the concept of searching through numerous physical resources extraordinarily inefficient and unfavourable. Additionally, this cohort of medical trainees prefer personally relevant material, while favouring educational content that is both high-yield and entertaining [42,43].

> *"Journalists have linked this online podcasting boom to the ubiquity of smartphones, time spent in transit, and online music services. Others attribute it to the brain-stimulating and addictive effects of audio learning, or the multitasking potential of listening. The beauty is in the overlap."*
>
> - Jeff D Jardins, Editor-in-Chief of Visual Capitalist

Section B – Podcasting in Emergency Medicine

Origins of Emergency Medicine

EM, as a recognised medical speciality, is one of the youngest to be admitted to a bouquet of medical postgraduate training programs. From its probable conception during the 1960s, to its official recognition in the United States of America (USA) in 1979, the speciality of EM would continue to expand during the coming decades; finally reaching Sub-Saharan shores via South Africa in 2004 [36–38].

Prevalence of Emergency Medicine Podcasts

There is no universal definition as to what constitutes an EM podcast. In much the same way that medical specialities contain their own emergencies, medical podcasts of various medical specialities accommodate content regarding emergencies related to their respective fields. For example, emergencies in paediatrics could be found in both paediatrics and EM. Therefore, a podcast focused on the paediatric speciality may cover topics relevant to paediatric EM but may not be specifically listed as an EM podcast.

Consequently, with the definition of an EM podcast being nebulous and flexible, using an automated, term-based search engine becomes problematic. Unless the podcaster includes the tag of 'emergency medicine' in the metadata upon upload to the host server, podcast cataloguing sites may fail to capture these and present them in a user search. Additionally, there are too many podcast servers and no single regulatory body of educational podcasts to peruse. Subsequently, there proved to be very few academic texts reporting, specifically, on the prevalence of academic emergency medicine podcasts.

Nevertheless, in 2019, Little et al. [44] conducted a Google-based search for educational, medical podcasts using the search-string "podcasts in _____"; where each medical speciality was inserted. The results from each search for the first 50 pages were then evaluated manually. They found that emergency medicine boasted the highest number of active podcasts (n=28), with a total of 2 434 episodes – the next highest being Internal Medicine with only 13 active podcast shows totalling just 1 374 episodes. Active podcasts being defined as any podcast with an episode released within the past 6 months of the search [44].

As a programme in its infancy, EM has a less well-established hierarchy of medical education compared to its counterparts. Around the same time that EM was gaining traction as a medical speciality, podcasting began increasing in popularity in education. Welcoming the opportunity to support a synchronous curriculum with an asynchronous component, it is likely that a kinship formed between EM and educational podcasting - residing under the broader umbrella of FOAMed – leading to the described popularity of podcasting in EM.

Utilisation Measures

Measuring the number of people who consume podcasts, or their usage patterns, is another complicated endeavour. Studies represent this value in different ways; some categorise 'usage' as a qualitative variable,

and those who consider it quantitative measure it by using varied qualifiers. Essentially, there is little homogeneity in existing literature from which to draw definite conclusions.

We found three articles that classified the utilisation of podcasts by qualifying podcast-users as registrars who access podcasts at least once a month. Purdy et al. [45] and Riddell et al. [46] – both studies from North America – listed the prevalence of podcast-usage among participants, ranging from 88.8% to 90%. The third study, by Thurtle et al. [47], reported only on the popularity of specific EM podcasts, but with an unknown qualifier. Additionally, their reported podcast-usage varied by the nationality of participants; 0% for Papua New Guinea, and one out of four for Botswana registrars.

Furthermore, a South African study reported that 21% of the surveyed division of EM in Cape Town used podcasts [48].

Methods of Access

Riddell et al. [46] found that most of their respondents (91.4%) listen to podcasts on their smartphone in the only study to explicitly report on preferred method of access to EM podcasts by trainees.

Although not reporting explicitly on podcasts, Kleynhans et al.[48] reported that desktop computers and laptops were the preferred mode of access to all online educational resources, while smartphones were the more popular option to interact with social media in their South African population.

Ideal Podcast Duration

In the only identified study with information on the preferred length of podcasts, the preponderance of registrars stated their ideal podcast would be 11-30 minutes [46]. Little et al. [44] calculated the average EM podcast episode to be 36.6 minutes long [40].

During semi-structured interviews with EM residents from the USA, respondents reported often choosing their podcasts by comparing the length of the podcast episode with the perceived free time they have between commitments, or during compatible planned activities (such as a commute to work or a regular jog) [49]. Interestingly, they admitted to pausing podcasts when the allotted time ended; preventing continuous, attentive and concentrated engagement to achieve deep understanding. Although the studied registrars acknowledged the negative aspects, and possible lost benefits, of these sporadic, irregular and staccato listening experiences, they nevertheless hoped they would gain some cumulative educational advantage from participating in them [49].

Reasons for Emergency Medicine Podcast-Usage

Purdy et al.[45] reported that the most popular reasons for EM registrars attempting to access podcasts as an educational medium were to gain auxiliary information on core EM knowledge (98%), procedural skills (95%) and studying diagnostic imaging (92%). Podcast-usage for Just-in-time teaching (JiTT) proved a popular theme for North American-based EM registrars [45,50–52].

Respondents selected podcast episodes using the following guides and criteria: peer or faculty referral, duration compatibility with upcoming activities, entertainment value, benefit toward exam-preparation and as primers for new broad topics and medical language [45,46,49,50].

Residents reported incomplete or curtailed listening if they were distracted or found the podcasts too long, too boring or of poor quality [46,49].

The advantages and disadvantages of podcast-usage, compared to traditional methods, as presented by the reviewed literature, are given by Figure 2.

Barriers to Use

Although there are several free podcasts available for download, many hosting platforms require a paid subscription (to a website, journal, or academic course) to access their body of podcasts – which may be more valuable for students to consume. It is for this reason, and that of podcast-listeners requiring both internet connectivity and suitable listening devices, that Cho et al. [53] cites cost as a factor in why users may not listen to podcasts.

Additionally, Kleynhans et al. [48] found that a lack of electricity or access to the internet are other reasons given by EM personnel for not using podcasts. However, Thurtle et al. [47] noted that it was lack of awareness, rather than access, that precluded podcast usage. Interestingly, these limitations were not shared among participants from the included North American papers [45,46,49,50].

A universal impediment to podcast-usage was its inability to be context-specific [47–49].

Cost and feasibility of producing an EM podcast

At a minimum, creating an EM podcast requires recording hardware and software, editing software, and sufficient internet connectivity to upload to a podcast hosting service. To consume podcasts, the user would simply need a device capable of processing media-files and internet-connectivity to download or stream the podcast (Figure 1).

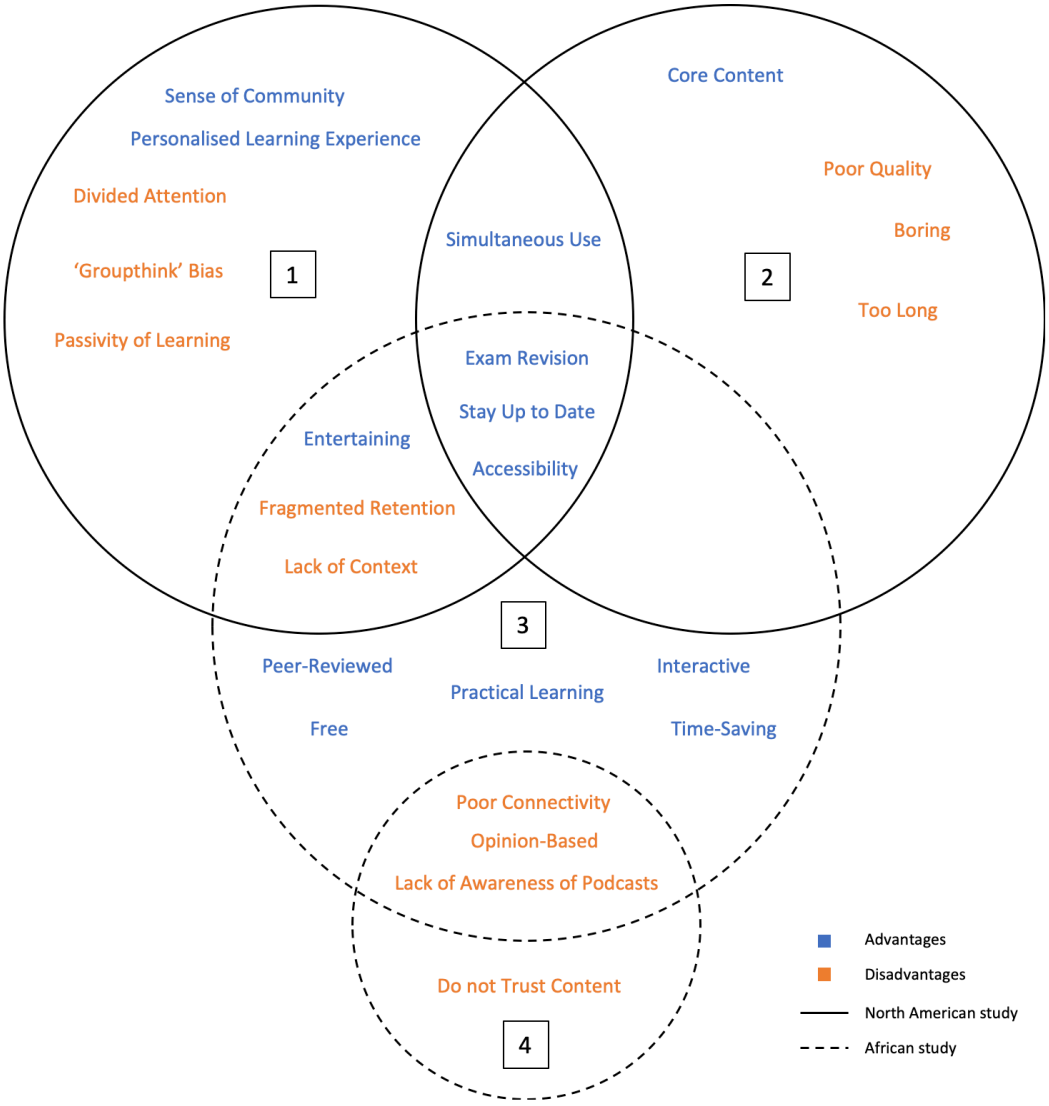

Figure 2 Venn diagram of studies including information on advantages and disadvantages of Emergency Medicine podcast-usage. **1.** Riddell et al. [49] **2.** Riddell et al. [46] **3.** Kleynhans et al. [48] **4.** Thurtle et al. [47]

Free editing software (such as Audacity, http://www.audacityteam.org/) is readily available for download, and relatively easy to operate. Various online platforms allow authors to distribute their material free of charge; iTunes, YouTube, and Facebook are a few examples. Hosting services range from freemium (free, with restrictions) to paid subscriptions – of which there are low-cost options [54].

Quality Assurance

Mallin et al. [50] reported that their studied EM registrars rarely (36.4%), and never (5.9%), evaluated the quality of the evidence referenced in a podcast episode. Only 77% of the registrars surveyed by Purdy et al. [45] thought that references in a podcast were necessary. Furthermore, Riddell et al. [49] noted that even when podcasts references were listed, registrars seldom reviewed them.

The social networking nature of educational podcasts leads to difficulties in determining their quality and impact. The freedom afforded by the podcasting-continuum often means that podcast creators have *carte*

blanche over their content, scope and delivery, without having to undergo review before publication. To date, there exists no standard quality assessment instrument for educational podcasts and FOAMed resources in general, placing the burden of proving the quality of these podcasts upon the user [55].

Current social networking metrics – including Facebook likes, Twitter retweets and Alex Rank [56] – typically place podcasts with a superior popularity-ranking higher up on a user-search results list [57]. Additionally, and correspondingly, user-reviews of podcasts have no standard template for critique and may result in a biased categorisation.

However, as experts in EM tend to be respected and popular among the FOAMed community, it is assumed that the content they review and share is likely of a higher quality. Thoma et al. [58] likened this concept to that of traditional, scientific peer review of published articles. This led to their development of the Social Media Index (SMi) as a quality measure of FOAMed resources; with a function analogous to that of the Journal Impact Factor (JIF) used for traditional medical journals.

Benefits of podcast-usage in EM

Two studies reported on the benefits of podcast-usage by using surrogate markers. Purdy et al. [45], reported that more respondents read studies in full (72%), and read more critical appraisals (79%), because of being able to access these materials through podcasts. Likewise, 72.2% of registrars studied by Riddell et al. [46] reported having changed their practice due to the influence of podcasts.

In a study by Mallin et al. [50], when simply asked if they found podcasts beneficial, 70.3% of residents replied in the positive.

Influence of level of training

According to the semi-structured interviews conducted by Riddell et al. [49], as the registrars' educational needs and experiences matured with time, many acknowledged a change in their listening habits; becoming more selective about content.

Purdy et al. [45] reported that a significantly larger number of residents used podcasts when compared to programme directors (90% v. 45%, $p < 0.01$). While not explicitly mentioning podcasts, or level of training, Kleynhans et al. [48] found a difference in social media usage between respondents under the age of 30 (94.4%) when compared with those over 35 (68.2%).

We could posit that these differences are the result of two prominent factors: a higher degree of comfort in accessing and navigating technology, social media and podcasts by the younger generation, and the receptiveness of millennial learners to asynchronous online education.

EM Podcasting in Southern Africa

Our google search for 'Emergency Medicine podcast in Africa' resulted in a handful of internationally based podcasts with episodes that pertain to the practice of EM in Africa. One such podcast is *The #badEM podcast*

[59] - hosted on SoundCloud (https://soundcloud.com); a second generation medical podcast focussed on Emergency Care in Africa, linked to the popular blog site Brave African Discussions in Emergency Medicine (#badEM) [60]. At the time of writing, SoundCloud hosts just two episodes from #badEM, with the last episode being published in October 2019.

Our search failed to return more results for active, locally produced, African EM educational podcasts.

Identification of gaps of needs for Further Research in Southern Africa

The following are some identified gaps for further investigation among EM registrars in Southern Africa:

- Current podcast-use characteristics – including prevalence, reasons for use and barriers to use
- Preferred podcast content
- Desired podcast format – including content-delivery and length preference
- Willingness to consume a locally produced, context-specific Southern African EM podcast.

Conclusion

Global podcast-usage – as an asynchronous educational adjunct – is popular among Emergency Medicine registrars. The value of podcasts to the current generation of learners, and those to come, increases in accordance with the importance and relevance of asynchronous education in Emergency Medicine. Targeted, context-specific inquiry into the EM podcasting continuum is imperative as Emergency Medicine continues to grow as a speciality across the world - Southern Africa being no exception. Finally, to better align podcast content with user needs, further research is required to elucidate the preferred podcast-usage characteristics of Emergency Medicine learners, including the benefits and risks of long-term educational podcast-usage.

References

[1] Khadpe J, Morley EJ, Rezaie SR, Grock A. Academic Life in Emergency Medicine (ALiEM) Blog and Podcast Watch: Gastrointestinal Emergencies. Cureus 2019;11:e5545. https://doi.org/10.7759/cureus.5545.

[2] Thoma B, Chan TM, Kapur P, Sifford D, Siemens M, Paddock M, et al. The Social Media Index as an Indicator of Quality for Emergency Medicine Blogs: A METRIQ Study. Annals of Emergency Medicine 2018. https://doi.org/10.1016/j.annemergmed.2018.05.003.

[3] Fulton JF. History of Medical Education. BMJ 1953;2:457–61. https://doi.org/10.1136/bmj.2.4834.457.

[4] Tawalare K, Sharir R, Tawalare K, Sharir K, Yende M. Charaka's normative theories of ethics insight from ayurveda. J Educ Technology Heal Sci 2020;6:59–61. https://doi.org/10.18231/j.jeths.2019.015.

[5] Yeoh K. The future of medical education. Singap Med J 2019;60:3–8. https://doi.org/10.11622/smedj.2019003.

[6] Otterness K. Incorporating FOAM into medical student and resident education. Clinical and Experimental Emergency Medicine 2017;4:119–20. https://doi.org/10.15441/ceem.16.196.

[7] Tamm EP, Ernst R, Weems W. The virtual lecture: delivery of live and recorded presentations over the Internet. Am J Roentgenol 1999;172:9–12. https://doi.org/10.2214/ajr.172.1.9888729.

[8] Paul JD. The Origins of Audio and Video Compression: Some Pale Gleams from the Past. Smpte 2014 Annu Technical Conf Exhib 2014:1–18. https://doi.org/10.5594/m001572.

[9] Musmann HG. Genesis of the MP3 audio coding standard. IEEE T Consum Electr 2006;52:1043–9. https://doi.org/10.1109/tce.2006.1706505.

[10] Group TMPE. MPEG 2019. https://mpeg.chiariglione.org (accessed December 13, 2019).

[11] Maag M. Podcasting and MP3 Players. Cin Comput Informatics Nurs 2006;24:9–13. https://doi.org/10.1097/00024665-200601000-00005.

[12] McKusick MK. Secondary storage and filesystems. Acm Comput Surv Csur 1996;28:217–9. https://doi.org/10.1145/234313.234404.

[13] Yates C, Ray L, Yang J. An investigation into iPod Touch generation 2 2011:94–8. https://doi.org/10.1145/2047456.2047470.

[14] Bull M. Iconic Designs: The Apple iPod. Senses Soc 2015;1:105–8. https://doi.org/10.2752/174589206778055619.

[15] Apple. Identifying your iPod Model 2019. https://support.apple.com/en-us/HT204217#ipod (accessed August 22, 2019).

[16] Thoma B, Joshi N, Trueger NS, Chan TM, Lin M. Five Strategies to Effectively Use Online Resources in Emergency Medicine. Ann Emerg Med 2014;64:392–5. https://doi.org/10.1016/j.annemergmed.2014.05.029.

[17] Murphy E, Rodríguez-Manzanares MA, Barbour M. Asynchronous and synchronous online teaching: Perspectives of Canadian high school distance education teachers. Brit J Educ Technol 2011;42:583–91. https://doi.org/10.1111/j.1467-8535.2010.01112.x.

[18] Pourmand A, Lucas R, Nouraie M. Asynchronous Web-Based Learning, a Practical Method to Enhance Teaching in Emergency Medicine. Telemed E-Health 2013;19:169–72. https://doi.org/10.1089/tmj.2012.0119.

[19] Jordan J, Jalali A, Clarke S, Dyne P, Spector T, Coates W. Asynchronous vs didactic education: it's too early to throw in the towel on tradition. BMC Med Educ 2013;13:105. https://doi.org/10.1186/1472-6920-13-105.

[20] Graves J, Graves V. Recorded lectures for GPs. Medical World 1961;94:451–5.

[21] Wray A, Bennett K, Boysen-Osborn M, Wiechmann W, Toohey S. Efficacy of an asynchronous electronic curriculum in emergency medicine education in the United States. Journal of Educational Evaluation for Health Professions 2017;14:29. https://doi.org/10.3352/jeehp.2017.14.29.

[22] Chan TM, Dzara K, Dimeo SP, Bhalerao A, Maggio LA. Social media in knowledge translation and education for physicians and trainees: a scoping review. Perspectives Medical Educ 2019;9:20–30. https://doi.org/10.1007/s40037-019-00542-7.

[23] Weston R, Crandall M, Ferrada P. Social Media and Free Open Access Medical (FOAM) Education. Curr Surg Reports 2019;7:4. https://doi.org/10.1007/s40137-019-0224-2.

[24] Nickson CP, Cadogan MD. Free Open Access Medical education (FOAM) for the emergency physician. Emergency Medicine Australasia 2014;26:76–83. https://doi.org/10.1111/1742-6723.12191.

[25] Burkholder TW, Bellows JW, King RA. Free Open Access Medical Education (FOAM) in Emergency Medicine: The Global Distribution of Users in 2016. The Western Journal of Emergency Medicine 2018;19:600–5. https://doi.org/10.5811/westjem.2018.3.36825.

[26] Cadogan M, Thoma B, Chan TM, Lin M. Free Open Access Meducation (FOAM): the rise of emergency medicine and critical care blogs and podcasts (2002–2013). Emerg Med J 2014;31:e76. https://doi.org/10.1136/emermed-2013-203502.

[27] Hammersley B. Audible revolution 2004. https://www.theguardian.com/media/2004/feb/12/broadcasting.digitalmedia (accessed January 24, 2020).

[28] Ramlogan S, Raman V, Education JSJ of D, 2014. A comparison of two forms of teaching instruction: video vs. live lecture for education in clinical periodontology. Wiley Online Library n.d.

[29] Hurst KM. Using video podcasting to enhance the learning of clinical skills: A qualitative study of physiotherapy students' experiences. Nurse Education Today 2016;45:206–11. https://doi.org/10.1016/j.nedt.2016.08.011.

[30] White JS, Sharma N, Boora P. Surgery 101: Evaluating the use of podcasting in a general surgery clerkship. Med Teach 2011;33:941–3. https://doi.org/10.3109/0142159x.2011.588975.

[31] Cheston CC, Flickinger TE, Chisolm MS. Social Media Use in Medical Education: A Systematic Review. Academic Medicine 2013;88:893–901. https://doi.org/10.1097/acm.0b013e31828ffc23.

[32] Mncube-Barnes F, Walker P, Block R, Whitehead A. Podcasting in Medical Education: A Literature Review. MedEdPublish 2014. https://doi.org/10.15694/mep.2014.003.0034.

[33] Chin A, Helman A, Chan T. Podcast Use in Undergraduate Medical Education. Cureus 2017;9:e1930. https://doi.org/10.7759/cureus.1930.

[34] Rainsbury JW, McDonnell SM. Podcasts: an educational revolution in the making? J Roy Soc Med 2006;99:481–2. https://doi.org/10.1177/014107680609900924.

[35] Wilson P, Petticrew M, Booth A. After the gold rush? A systematic and critical review of general medical podcasts. Journal of the Royal Society of Medicine 2009;102:1–6. https://doi.org/10.1258/jrsm.2008.080245.

[36] Williams DJ. Brief history of the specialty of emergency medicine. Emerg Medicine J EMJ 2017;35:139–41. https://doi.org/10.1136/emermed-2017-207257.

[37] Merritt AK. The rise of emergency medicine in the sixties: paving a new entrance to the house of medicine. J Hist Med All Sci 2012;69:251–93. https://doi.org/10.1093/jhmas/jrs054.

[38] Wen LS, Geduld HI, Nagurney JT, Wallis LA. Africa's First Emergency Medicine Training Program at the University of Cape Town/Stellenbosch University: History, Progress, and Lessons Learned. Acad Emerg Med 2011;18:868–71. https://doi.org/10.1111/j.1553-2712.2011.01131.x.

[39] Kurup V. The New Learners—Millennials!! Int Anesthesiol Clin 2010;48:13–25. https://doi.org/10.1097/aia.0b013e3181e5c1b4.

[40] Rauch J. Generation next 2018. https://worldin2019.economist.com/millennialsvboomers (accessed September 20, 2019).

[41] Black A. Gen Y: Who They Are and How They Learn. JSTOR 2010;88:92–101.

[42] Roehl A, Reddy SL, Shannon GJ. The Flipped Classroom: An Opportunity To Engage Millennial Students Through Active Learning Strategies. J Fam Consumer Sci 2013;105:44–9. https://doi.org/10.14307/jfcs105.2.12.

[43] Young TP, Bailey CJ, Guptill M, Thorp AW, Thomas TL. The Flipped Classroom: A Modality for Mixed Asynchronous and Synchronous Learning in a Residency Program. Western Journal of Emergency Medicine 2014;15:938–44. https://doi.org/10.5811/westjem.2014.10.23515.

[44] Little A, Hampton Z, Gronowski T, Meyer C, Kalnow A. Podcasting in Medicine: A Review of the Current Content by Specialty. Cureus 2020;12:e6726. https://doi.org/10.7759/cureus.6726.

[45] Purdy E, Thoma B, Bednarczyk J, Migneault D, Sherbino J. The use of free online educational resources by Canadian emergency medicine residents and program directors. CJEM 2015;17:101–6. https://doi.org/10.1017/cem.2014.73.

[46] Riddell J, Swaminathan A, Lee M, Mohamed A, Rogers R, Rezaie SR. A Survey of Emergency Medicine Residents' Use of Educational Podcasts. West J Emerg Medicine 2017;18:229–34. https://doi.org/10.5811/westjem.2016.12.32850.

[47] Thurtle N, Banks C, Cox M, Pain T, Furyk J. Free Open Access Medical Education resource knowledge and utilisation amongst Emergency Medicine trainees: A survey in four countries. African Journal of Emergency Medicine 2016;6:12–7. https://doi.org/10.1016/j.afjem.2015.10.005.

[48] Kleynhans AC, Oosthuizen AH, Hoving DJ van. Emergency medicine educational resource use in Cape Town: modern or traditional? Postgrad Med J 2017;93:250–5. https://doi.org/10.1136/postgradmedj-2016-134135.

[49] Riddell J, Robins L, Brown A, Sherbino J, Lin M, Ilgen JS. Independent and Interwoven: A Qualitative Exploration of Residents' Experiences With Educational Podcasts. Acad Med 2020;95:89–96. https://doi.org/10.1097/acm.0000000000002984.

[50] Mallin M, Schlein S, Doctor S, Stroud S, Dawson M, Fix M. A survey of the current utilization of asynchronous education among emergency medicine residents in the United States. Academic Medicine: Journal of the Association of American Medical Colleges 2014;89:598–601. https://doi.org/10.1097/acm.0000000000000170.

[51] Mangum R, Lazar J, Rose MJ, Mahan JD, Reed S. Exploring the Value of Just-in-Time Teaching as a Supplemental Tool to Traditional Resident Education on a Busy Inpatient Pediatrics Rotation. Acad Pediatr 2017;17:589–92. https://doi.org/10.1016/j.acap.2017.04.021.

[52] Schuller MC, DaRosa DA, Crandall ML. Using just-in-time teaching and peer instruction in a residency program's core curriculum: enhancing satisfaction, engagement, and retention. Acad Medicine J Assoc Am Medical Coll 2015;90:384–91. https://doi.org/10.1097/acm.0000000000000578.

[53] Cho D, Cosimini M, Espinoza J. Podcasting in medical education: a review of the literature. Korean Journal of Medical Education 2017;29:229–39. https://doi.org/10.3946/kjme.2017.69.

[54] Lichtenheld A, Nomura M, Chapin N, Burgess T, Kornegay J. Development and Implementation of an Emergency Medicine Podcast for Medical Students: EMIGcast. The Western Journal of Emergency Medicine 2015;16:877–8. https://doi.org/10.5811/westjem.2015.9.27293.

[55] Lin M, Thoma B, Trueger NS, Ankel F, Sherbino J, Chan T. Quality indicators for blogs and podcasts used in medical education: modified Delphi consensus recommendations by an international cohort of health professions educators. Postgraduate Medical Journal 2015;91:546–50. https://doi.org/10.1136/postgradmedj-2014-133230.

[56] Alexa: The Web Information Company. Alexa Rank 2019. https://www.alexa.com (accessed November 21, 2019).

[57] Chan TM, Thoma B, Krishnan K, Lin M, Carpenter CR, Astin M, et al. Derivation of Two Critical Appraisal Scores for Trainees to Evaluate Online Educational Resources: A METRIQ Study. West J Emerg Medicine 2016;17:574–84. https://doi.org/10.5811/westjem.2016.6.30825.

[58] Thoma B, Sanders JL, Lin M, Paterson QS, Steeg J, Chan TM. The Social Media Index: Measuring the Impact of Emergency Medicine and Critical Care Websites. West J Emerg Medicine 2015;16:242–9. https://doi.org/10.5811/westjem.2015.1.24860.

[59] #badEM. Brave African Discussions in Emergency Medicine - Podcast | Free Listening on SoundCloud 2020. https://soundcloud.com/user-502726289 (accessed May 6, 2020).

[60] Stassen W, Wylie C, Kingma K, Evans K, Park-Ross J, Redfern A, et al. #badEM - Brave African Discussions in Emergency Medicine 2020. https://badem.co.za (accessed April 16, 2020).

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Appendix. Data Extraction Table

AUTHOR (S)	YEAR	TITLE	STUDY TYPE	COUNTRY	STUDY POPULATION
Purdy et al.	2015	The use of free online educational resources by Canadian emergency medicine residents and program directors	Survey	Canada	Residents (n = 214)
Mallin et al.	2014	A Survey of the Current Utilization of Asynchronous Education Among Emergency Medicine Residents in the United States	Survey	United States of America	Residents (n = 219)
Kleynhans et al.	2016	Emergency medicine educational resource use in Cape Town: modern or traditional?	Survey	South Africa	Faculty and Postgraduate students at division of EM, Cape Town (n = 87); Registrars (n = 34)
Riddell et al.	2016	A Survey of Emergency Medicine Residents' Use of Educational Podcasts	Survey	United States of America	Residents (n = 356)
Little et al.	2020	Podcasting in Medicine: A Review of the Current Content by Specialty	Google-based investigational search literature review	Global	A google-based search of all podcasts in medicine
Riddell et al.	2020	Independent and Interwoven: A Qualitative Exploration of Residents' Experiences With Educational Podcasts	Semi-structured interviews	United States of America	Residents (n=16)
Thurtle et al.	2015	Free Open Access Medical Education resource knowledge and utilisation amongst Emergency Medicine trainees: A survey in four countries	Survey	Australia, United Kingdom, Papua New Guinea	Registrars (n = 44)

Appendix. Data Extraction Table Continued

AUTHOR (S)	PREVALENCE OF PODCASTS	PREVALENCE OF PODCAST-USAGE	REASONS FOR USE	REASONS FOR NON/CAUTIONARY USE
Purdy et al.		Podcasts (90%), Vodcasts (71%) usage by respondents at least once a month	Core EM Education (98%); Procedural Skills (95%); Diagnostic/imaging interpretation (92%); JiTT (86%); Investigating controversial topics (82%)	Not reported
Mallin et al.		Respondents spent 35% of the extracurricular time on podcasts		Not reported
Kleynhans et al.		Podcasts (21%); YouTube (35%)	Timesaving; Entertaining; Peer reviewed; interactive; up to date; Free; Practical Learning; Revision for exams;	Mostly people's opinions; Time consuming; no awareness; internet and electricity concerns; bandwidth restriction; read and retain faster than video
Riddell et al.		Podcasts used by 88.8% of respondents at least monthly; Once a week (48%)	Keep with current literature (88.5%); Learn EM core content (70.2%); Portability (66.9%); Learn while doing something else (65.5%); Ease of use (66%)	Respondents stopped listening if: Too boring (57.9%); Not high quality (57.9%); Too long (55.2%)
Little et al.	Total number of Emergency Medicine podcasts (32), Active podcasts (28). Total Episodes (2 434)		Not studied	Not studied
Riddell et al.		All (100%) of the study's participants used podcasts for education - likely selection bias as the study set out to study those residents who use podcasts	Described usage patterns into three themes: Opportunistic engagement (accessibility, divided attention, entertainment); community (Podcast host, peers, faculty), personalized learning (pressure to study, exposure, fill knowledge gaps).	Divided attention - knowledge retention from podcasts not great; groupthink bias; Lack of context-relevant material; Fragmented learning; incomplete; passivity of the learning experience;
Thurtle et al.		75% of Respondents were aware of podcasts. Use of podcasts at least once a month by name: *Ultrasound (9%), SmartEM (7%), ER Cast (9%), PHARM (11%), SGEM (5%).* Use by country: PNG (0, 0%); Botswana (1, 25%)	not studied	Lack of access [1 (25%) Botswana respondents]; Not Easy to Navigate [1 (4%) of Australian respondents]; Do not trust content [2 (20%) of UK respondents, 2 (9%) of Australian respondents]

Appendix. Data Extraction Table Continued

AUTHOR (S)	QUALITY METRICS	CHOICE OF TOPIC	BENEFITS OF PODCAST-USAGE	LENGTH	METHODS OF ACCESS
Purdy et al.	77% of residents thought references where important	JiTT (86%); Investigating controversial topics (82%); Entertainment value (41%); Peer referral (50%)	72% read studies in full; 79% read more critical appraisals		
Mallin et al.	36.4% rarely and 5.9% never evaluate the quality of evidence	80% based on recent clinical encounters	70.3% reported podcasts as beneficial		
Kleynhans et al.	None listed	No data			Computers (desktop and laptop) were most frequently used to access educational resources except for social media where smartphones were preferred.
Riddell et al.		Peer referral (88.7%); Faculty referral (65.7%)	Podcasts change their clinical practice (72.2%)	84.6% reported ideal length <30m	Smartphones (91.4%)
Little et al.	not studied	not studied		36.6m average per episode; 1 485 hours of content	
Riddell et al.	Sometimes performed literature review/search after listening to a podcast	Primers for broad topics; based on perceived length of an activity that can be done simultaneously		Related to daily activities that can be done simultaneously with podcast consumption	
Thurtle et al.	Not studied	Not reported – just lists popular podcasts used	Not reported	Not Studied	

Part B: Manuscript in Article Format

African Journal of Emergency Medicine (*AfJEM*)

Title Page

An electronic survey of preferred podcast format and content requirements among trainee Emergency Medicine specialists in four Southern African Universities

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Abstract

Introduction

Global usage of educational Emergency Medicine (EM) podcasts is popular and ever-increasing. This study aims to explore the desired content, format, and delivery characteristics of a potential educational, context-specific Southern African EM podcast, by investigating current podcast usages, trends and preferences among Southern African EM registrars of varying seniority.

Methods

We developed an electronic survey - using a combination of existing literature, context-specific specialist-training guidance, and input from local experts – exploring preferred podcast characteristics among EM registrars from four Southern African universities.

Results

The study's response rate was 75%, with 24 of the 39 respondents being junior registrars. Ninety-four percent (94%) of respondents used EM podcasts as an educational medium: 64% predominantly using podcasts to supplement a personal EM study program. The primary mode of accessing podcasts was via personal mobile devices (84%). Additionally, respondents preferred a shorter podcast duration (5–15 minutes), favoured multimedia podcasts (56%) and showed an apparent aversion towards recorded faculty lectures (5%). Eighty-two percent (82%) of respondents preferred context-specific podcast content, with popular topics including toxicology (95%), cardiovascular emergencies (79%) and medico-legal matters (74%). Just-in-Time learning proved an unpopular learning strategy in our study population, despite its substantial educational value.

Conclusion

Podcast-usage proved to be near-ubiquitous among the studied Southern African EM registrars. Quintessentially, future context-specific podcast design should cater for mobile device-use, shorter duration podcasts, more video content, context-specific topics, and content optimised for both Just-in-Time learning.

Keywords

Emergency Medicine; Online education; Podcasts; FOAMed; asynchronous online learning.

African relevance

- Educational Emergency Medicine (EM) podcasts are widely available and increasing in popularity globally - including in Southern Africa.
- Many of the globally available EM podcasts lack the content and delivery characteristics specific to the Southern African EM context.
- Until now, precise user-uptake, usage and access trends, and the preferred podcast characteristics of EM podcasts in Southern Africa remained unexplored.
- This study demonstrates the desirability of educational, context-specific Southern African EM podcasts and presents several noteworthy observations for prospective podcast developers and educationalists in creating such podcasts.

Title

An electronic survey of preferred podcast format and content requirements among trainee Emergency Medicine specialists in four Southern African Universities.

Introduction

For the current generation of training emergency medicine (EM) specialists, the popularity of traditional teaching platforms – such as overhead projector slides, didactic PowerPoint lectures and seminars – is diminishing [1]. Social media, and the Free Open-Access Medical education (FOAMed) movement, has brought life to various methods of asynchronous online-learning [2]. Blog sites, Twitter feeds, YouTube channels, Facebook pages and Podcast shows are a few examples of online multimedia platforms where medical education is consumed and actively participated in.

Podcasts are recorded digital-audio segments, made available episodically for download or live streaming [3]. Their benefits in medical education have been well documented [4,5]. Podcasts also provide an excellent source of asynchronous and self-directed learning [6]. There is a significant and growing body of emergency medicine (EM) podcasts available [7].

At least 88% of EM registrars, in a survey of training programs across the United States of America (USA), reported listening to podcasts at least once a month [8]. The two most popular reasons for podcast consumption were to keep up with current literature and review core EM knowledge. Importantly, 70% reported changing their clinical practice based on their exposure to podcast content.

Podcasts – as an e-learning tool – may prove to be well-suited to the current Southern African Generation Y EM trainees [9]. Podcasts' effectiveness as an educational medium is associated with how well the content aligns with the perceived needs of its listeners [10]. Additionally, She et al. [11] suggested that the creation of an asynchronous curriculum is both feasible and effective for EM trainees. Therefore, a context-specific podcast, developed for the educational needs of Southern African EM trainees, could both directly engage and benefit its audience.

Contrary to popular belief, Matt Brown Media [12] demonstrated that, of the 15 682 South African citizens surveyed, only 10.2% cited a lack of access as a barrier to podcast consumption. Likewise, Thurtle et al. [13] showed that it is not a lack of access, but rather a lack of awareness, that is the primary barrier to medical podcast-usage in other African countries.

Currently, there is limited data on the use and benefits of educational podcasts in Southern Africa. After surveying the use of online-educational multimedia in the division of Emergency Medicine in Cape Town (EMCT), Kleynhans et al. [14] reported that only 21% used educational podcasts, despite more than 50% accessing some form of online educational resource at least once a month.

This study aims to explore the optimal content, format, and delivery characteristics of a potential educational, context-specific Southern African EM podcast, by investigating current podcast usage, trends and preferences among Southern African EM registrars of varying seniority.

Methods

The study used a cross-sectional electronic survey to explore current podcast usages, trends and preferences of EM registrars w from one of four Southern African universities.

Study Population

The study population includes registrars from EM specialist training programmes who were who were officially registered for the four-year Master of Medicine (MMed) offered by the following Southern African universities during the 2019 and 2020 academic years:

- The University of Botswana (UB) (n = 5),
- The University of Cape Town (UCT) (n = 18),
- The University of Pretoria (UP) (n = 12), and
- The University of Stellenbosch (SU) (n = 17).

We define EM registrars as doctors currently working in a specialist training post in EM; junior registrars as first or second year of training, and senior registrars as years three or above.

Survey Development

Matava et al. [10] conducted a similar study on Canadian Anaesthesia registrars. We obtained permission to adapt their questionnaire to the Southern African EM context by using the syllabus of the Faculty of the College of Emergency Medicine South Africa (FCEM-SA) [15,16]. The blueprint of this syllabus guides training at the universities surveyed.

From this, identified potential podcast-topics were separated into four groups: practical, basic-science, clinical and professional. Additional professional topics were proposed by the investigators, who were lecturers in the universities' MMed programs.

The survey was reviewed for content and face validity by an educationalist and EM specialist from SU and UCT, respectively. The final survey (Appendix) explored the following:

- Current podcast-use characteristics,
- Preferred podcast topics (listed above),
- Desired podcast format (including content-delivery and length preference), and
- The willingness to consume a context-specific Southern African EM podcast.

Survey testing

The survey instrument required no alteration after pilot testing on two EM registrars from UCT who assessed for clarity and user-friendliness. While we excluded the results of the pilot survey from the final data analysis, both EM registrars were sent the final survey for completion.

Survey Administration, Distribution and Data Collection

We obtained approvals from the SU Health Research Ethical Committee (Ref no: S19/09/194) and the included institutions. A hyperlink to the online survey was provided to the relevant MMed division heads, who distributed it to their EM registrars.

After consenting, respondents were directed to the electronic survey administered via the personal, password-protected Google Forms (Google Inc.) account of the primary author.

Responses were collected anonymously and without potentially identifiable information. Collected demographic information included only the year of study and current university affiliation. We collected responses from February to April 2020; sending regular one-monthly reminders to increase response rates. Data analysis included incomplete responses.

Data analysis

Survey data was exported to Microsoft Excel (Microsoft Co.) for analysis. Descriptive statistics were used to summarise categorical data and the two-tailed Fishers exact test to analyse nominal data. A p-value < 0.05 was regarded as statistically significant.

The response rate calculation was based on total eligible responders and included partially completed survey responses.

Results

Thirty-nine registrars responded (75% response rate), with the most (n = 14) from UCT (Figure 1).

Figure 3 Respondents by University and Level of training

The prevalence of medical podcast-usage was 95%, with 65% of respondents devoting 1–4 hours a week to podcast consumption. Eighty-two percent of respondents accessed content from a mobile device. Desktop/laptop use (both streaming and downloading) was less preferred (Table 1).

Table 1 Podcast use characteristics by the level of training

		Junior Registrars (n=24)	Senior Registrars (n=15)	Total Respondents (n=39)	*p* values
Methods used to view podcasts					
	Stream directly via a portable device	13 (54%)	7 (47%)	20 (51%)	0.23
	Download on a portable device	11 (46%)	8 (53%)	19 (49%)	0.23
	Stream directly via desktop/laptop online	3 (13%)	4 (27%)	7 (18%)	0.18
	Download on desktop/laptop for offline use	3 (13%)	4 (27%)	7 (18%)	0.18
	I do not review podcast material	1 (4%)	1 (7%)	2 (5%)	0.49
Manner in which podcasts are used					
	As part of your personal EM study program	18 (75%)	7 (47%)	25 (64%)	0.06
	Revision for assessments	8 (33%)	8 (53%)	16 (41%)	0.13
	Introduction of new EM curriculum topic	11 (46%)	4 (27%)	15 (38%)	0.14
	Post clinical shift review	8 (33%)	2 (13%)	10 (26%)	0.12
	Pre-procedural or real-time case review during clinical shift	4 (17%)	2 (13%)	6 (15%)	0.34
	I do not use medical podcasts	1 (4%)	1 (7%)	2 (5%)	0.49
Favoured podcast type by learning preference					
	Multimedia podcasts (audio with still images or slideshow)	13 (54%)	9 (60%)	22 (56%)	0.24
	Podcast with accompanying PDF / Blog posts	13 (54%)	6 (40%)	19 (49%)	0.18
	Audio only podcasts	10 (42%)	7 (47%)	17 (44%)	0.25
	Video podcasts	13 (54%)	1 (7%)	14 (36%)	*0.002*
	Recorded faculty lectures	1 (4%)	1 (7%)	2 (5%)	0.49
	I am not interested in medical podcasts	0 (0%)	1 (7%)	1 (3%)	0.38

Sixty-four percent of the respondents used podcasts as a part of their EM study plan, and 41% used podcasts to revise for formal assessments. Only 15% used podcasts immediately before a case or procedure while on a clinical shift.

Fifty-six percent of respondents preferred podcasts with multimedia content – audio with accompanying still images or slideshows. Podcasts with show-notes (portable document format (PDF) or blog posts) interested 49% of respondents, while recorded didactic lectures were the least popular (5%).

Junior registrars, when compared to senior registrars, preferred video podcasts (54% v. 7%, p = 0.002). A higher proportion of junior registrars also preferred to use podcasts as a part of their EM study program (75% v. 47%, p = 0.057), while senior registrars preferred to use podcasts to revise for assessments (53% v. 33%, p = 0.125).

Reasons for failure to regularly use podcasts included a lack of available time (38%, 3/8) and a lack of familiarity with accessing course content via podcasts (25%, 2/8). A solitary respondent reported having no access to a listening or viewing device.

The ranking of respondents' preferred podcast topics is reflected in Table 2.

Table *2* Preferred podcast topics by level of training

		Junior Registrars (n=24)	**Senior Registrars** (n=15)	**Total Respondents** (n=39)	***p* values**
Practical topics					
	Ventilator management	18 (75%)	14 (93%)	32 (82%)	0.13
	Basic critical care and resuscitation skills (e.g. Rapid sequence induction; airway management)	18 (75%)	11 (73%)	29 (74%)	0.29
	Ultrasound-guided procedures	18 (75%)	11 (73%)	29 (74%)	0.29
	Basic orthopaedic skills (e.g. Fracture/dislocation management)	15 (63%)	12 (80%)	27 (69%)	0.15
	Trauma resuscitation (e.g. Resuscitative thoracotomy; lateral canthotomy)	15 (63%)	11 (73%)	26 (67%)	0.22
	Procedural analgesia sedation	10 (42%)	11 (73%)	21 (54%)	*0.04*
	None of the above	0 (0%)	1 (7%)	1 (3%)	0.38
Basic science topics					
	Research Methods / Biostatistics	16 (67%)	10 (67%)	26 (67%)	0.27
	Physiology	16 (67%)	9 (60%)	25 (64%)	0.24
	Pharmacology	17 (71%)	7 (47%)	24 (62%)	0.09

Table 2 Preferred podcast topics by level of training
(Continued)

	Pathology	14 (58%)	8 (53%)	22 (56%)	0.25
	Clinical Anatomy	11 (46%)	5 (33%)	16 (41%)	0.20
Professional topics					
	Emergency Medicine in Resource-limited settings	19 (79%)	12 (80%)	31 (79%)	0.31
	Medico-legal issues	15 (63%)	14 (93%)	29 (74%)	***0.03***
	Crisis Management	16 (67%)	11 (73%)	27 (69%)	0.26
	Professionalism and ethics	17 (71%)	7 (47%)	24 (62%)	0.09
	Time Management	11 (46%)	9 (60%)	20 (51%)	0.18
	Morbidity and Mortality in the Emergency Department	12 (50%)	8 (53%)	20 (51%)	0.25
	Finance and wellbeing for Emergency Physicians	14 (58%)	6 (40%)	20 (51%)	0.14
	Organ Donation in the Emergency Department	10 (42%)	9 (60%)	19 (49%)	0.14
	Patient safety in the Emergency Department	10 (42%)	6 (40%)	16 (41%)	0.26
Clinical topics					
	Toxicology	24 (100%)	13 (87%)	37 (95%)	0.14
	Cardiovascular emergencies	18 (75%)	13 (87%)	31 (79%)	0.23
	Pulmonary emergencies	17 (71%)	13 (87%)	30 (77%)	0.17
	Resuscitative problems and techniques	18 (75%)	10 (67%)	28 (72%)	0.24
	Acute signs and symptoms in children	16 (67%)	12 (80%)	28 (72%)	0.20
	Renal and genito-urinary emergencies	16 (67%)	11 (73%)	27 (69%)	0.26
	Gastrointestinal emergencies	14 (58%)	11 (73%)	25 (64%)	0.18
	Acute signs and symptoms in adults	14 (58%)	10 (67%)	24 (62%)	0.23
	Infectious disease and allergy	15 (63%)	9 (60%)	24 (62%)	0.26
	Gynaecological and obstetrical emergencies	12 (50%)	10 (67%)	22 (56%)	0.18
	Pre-hospital emergency	11 (46%)	9 (60%)	20 (51%)	0.18
	Emergency wound management	11 (46%)	7 (47%)	18 (46%)	0.26

When compared to junior registrars, a significantly higher proportion of senior registrars requested topics on procedural sedation (73% v. 42%, p = 0.04), medico-legal matters (93% v. 63%, p = 0.03) (Table 2) and a combination of both (67% v. 33%, p = 0.04). Conversely, junior registrars preferred pharmacology (71% v. 47%, p = 0.09) and ventilator management (93% v. 75%, p = 0.13).

There was a distinct preference for a duration of 5–15 minutes for all podcast content-delivery type categories (Figure 2a).

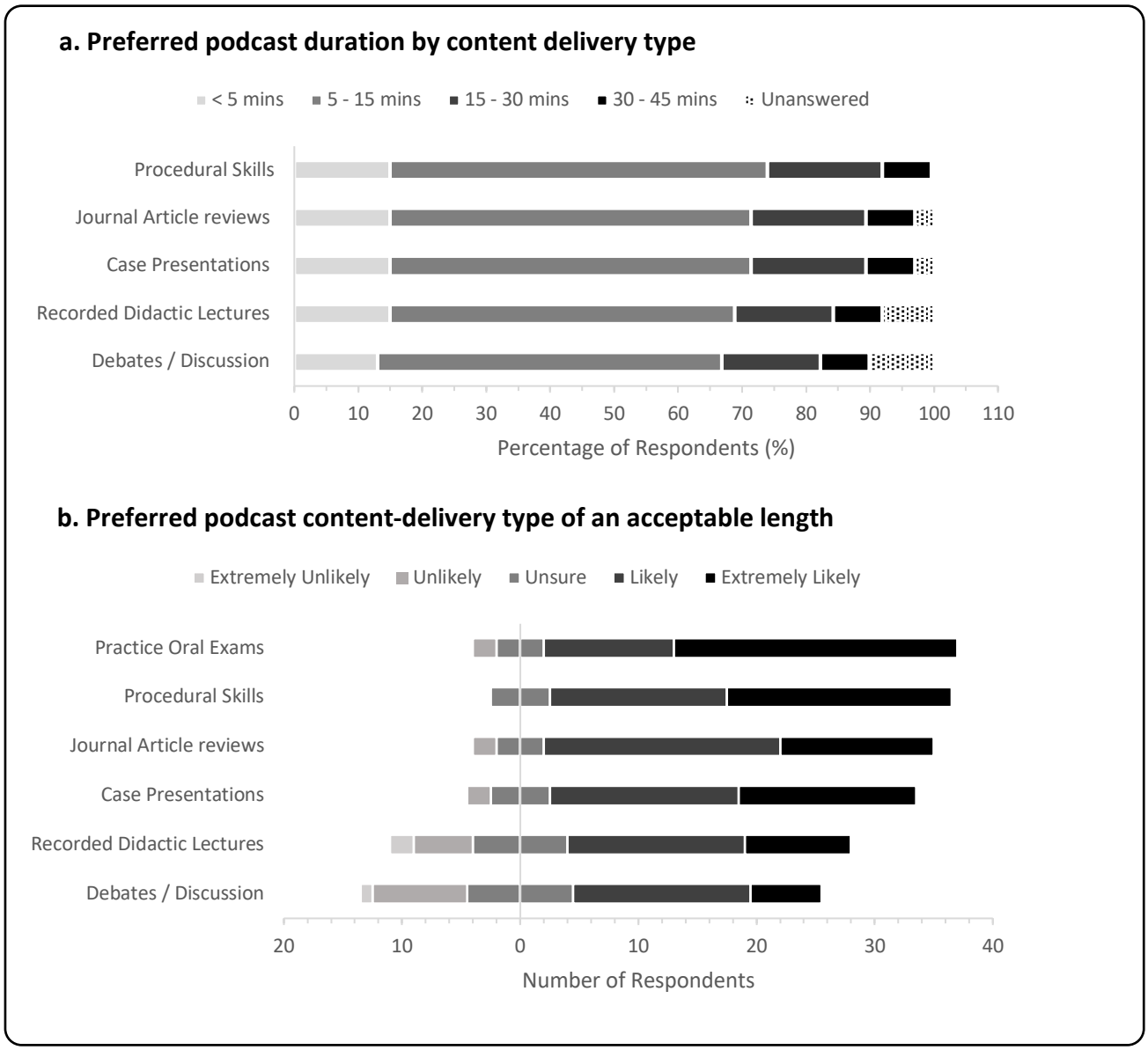

Figure 4 Ranking of desired podcast format. **a.** Ranking of preferred length for given podcast content delivery type by percentage of respondents. **b.** Ranking of respondents' likelihood of listening to a podcast delivery type of an acceptable length.

Practice oral exams were the most desired content-delivery type (Figure 2b), with 62% responding that they would be 'extremely likely' – and a further 28% 'likely' – to consume this. Procedural skills showed a similar distribution, while recorded didactic lectures – together with debates or discussions – were least popular.

More than half of the respondents (24/39) felt that, in addition to links to supplementary FOAMed resources, rapid review flashcards (24/39) and multiple-choice question (MCQ) quizzes (23/39) would aid in knowledge retention. One respondent reported that podcasts alone were adequate.

Eighty-two percent (32/39) of registrars stated that they would be either 'likely' (18/39) or 'extremely likely' (18/39) to consume a context-specific Southern African emergency medicine podcast (Table 3).

Table 3 Respondents' likelihood of watching a context-specific Southern African emergency medicine podcast

	Junior Registrars (n = 24)	**Senior Registrars** (n = 15)	**Total Respondents** (n = 39)
Extremely likely	9 (38%)	7 (47%)	16 (41%)
Likely	11 (46%)	5 (33%)	16 (41%)
Neutral	4 (17%)	1 (7%)	5 (13%)
Unlikely	0 (0%)	1 (7%)	1 (3%)
Extremely unlikely	0 (0%)	1 (7%)	1 (3%)

Discussion

Our study demonstrated a near-ubiquitous use of educational podcasts among the studied EM registrars. The high prevalence (95%) of podcast-use in our study corresponds with EM registrar podcast-usage in the USA; a 2014 study reporting that 70.3% of EM registrars endorsed the use of educational podcasts, and a 2017 study reporting a podcast-usage prevalence of 88.8%, among the respective EM registrars studied [6,8]. This implication of a global trend towards increased podcast usage proves encouraging for a locally produced educational EM podcast.

Respondents in our study reported a preponderance of mobile device use for accessing podcast material. This correlates with a study by Riddell et al. [8], who found that 91.4% of USA-based EM registrars accessed podcasts via their smartphones.

Antithetically, a study of Canadian anaesthesia registrars reported that only 38% of respondents downloaded podcasts onto their mobile devices [10]. A similar study of Canadian undergraduate medical students reported they often co-browsed other desktop applications and websites while simultaneously consuming podcasts [17]. Conceivably, the unique – and often unpredictable – context of EM training programs requires an easily accessible podcast solution, available for asynchronous consumption, above a more structured, and possibly more comprehensive, desktop-based consumption schedule.

However, mobile connectivity is firmly considered the primary and preferred method of internet access across Southern Africa, thereby supporting its use for podcast consumption [18]. Additionally, smart devices

are continually gaining in storage capacity and processing power, improving their capability for multimedia consumption. Furthermore, mobile devices outnumber their desktop counterparts due to their relatively lower cost and operational requirements. Consequently, we recommend that Southern African context-specific podcasts should be optimised for both mobile connectivity and mobile device use.

Junior registrars were significantly more likely to consume video podcasts, in comparison to senior registrars (54% v. 7%, $p = 0.002$). Purdy et al. [19] noted a similar finding when comparing video podcast-usage between Canadian EM residents and EM Program Directors (71% v. 27%, $p < 0.01$). Correspondingly, Kleynhans et al. [14] found that at least 35% of the surveyed division of EMCT reported the use of YouTube as an educational medium. These findings suggest that younger learners may be more inclined to engage with video content. In her book, Gen Y: Who They Are and How They Learn, Alison Black [20] suggested that fast-paced video games and access to online video sharing since childhood have made Generation Y learners more receptive to educational media with higher subjective entertainment value. Likewise, by conducting a series of semi-structured interviews of EM registrars, Riddell et al. [21] found that both entertainment and engagement are substantial driving factors that positively affect podcast use. This possible development in learning styles requires further exploration in subsequent generations of EM registrars as, presently, there is no evidence to claim that EM registrars learn more effectively in one perceptual mode versus another [9,22].

Although clinical toxicology was by far the most popular podcast topic in our study, a direct comparison with international literature proved problematic due to different context-specific educational needs and EM topic category groupings. Nevertheless, *The Dantastic Mr Tox and Howard Show* is an international podcast dedicated to toxicology, which ranks among the most popular of all listed Apple Podcasts [23]. The show has an average user rating of 4.8/5, with reviewers crediting it as being both ‘high-yield’ and ‘entertaining’. This alludes to a general appreciation of toxicology as a popular podcast topic throughout the global EM community. Local factors may also contribute to the popularity of toxicology as a podcast topic in our study. One such factor may be the significant burden of deliberate self-poisoning presentations placed on local emergency departments (ED), as demonstrated by van Hoving et al. [24].

Our study demonstrates that a significant proportion of junior registrars preferred to use podcasts as part of their EM study program (75% v. 47%, $p = 0.06$) and as an introduction to new curriculum topics (46% v. 27%, $p = 0.14$). Conversely, their senior counterparts favoured podcast-use as a tool for revision for assessments (53% v. 33%, $p = 0.13$). These differing preferences likely reflect the diverging educational needs specific to the respondents' level of training.

Interestingly, the level of training of respondents did not appear to have a considerable influence on the overall preferences of podcast topics in our study (Table 2). However, senior registrars were more inclined to request a combination of both procedural sedation and medico-legal matters (67% v. 33%, $p = 0.04$), plausibly reflecting the increased clinical exposure to these topics during the senior years of EM registrar training.

A 2009 study by Hodkinson et al. [25] noted that a significant medico-legal risk existed among Cape Town's EDs, where procedural sedation-analgesia (PSA) was performed. Remarkably, they found that only 15.3% of the EDs had written protocols to guide practitioners. Moreover, Meyer et al. [26] demonstrated that none of the PSA administered at Steve Biko Hospital in Pretoria had documented informed consent. In a study in Southern Gauteng, Delecia et al. [27] concluded that, apart from institutional risk-management, structured, formal training is vital to mitigate the medico-legal risks associated with PSA. These findings highlight the importance of the perceived need for further asynchronous context-specific educational support on these topics by respondents in our study.

Just-in-Time (JiT) learning (self-directed, personalised learning at the time of need) has proven to be a successful and productive adult learning strategy in medical education [27,28]. Fascinatingly, our study reports low podcast-use for just-in-time learning during (15%) and immediately after (26%) a clinical shift. This contrasts with the findings of Mallin et al. [6], who showed that 80% of EM registrars in their study used recent patient encounters to guide the podcast content that they reviewed. Furthermore, in a study by Purdy et al. [19], 86% of the Canadian EM registrars surveyed used online resources for answering questions at the point of patient care. The complex educational and cultural factors, likely responsible for the diversities seen in the uptake of JiT learning in our study population, warrant further study. An essential step toward incorporating JiT learning among Southern African EM registrars would be providing more context-specific and readily accessible educational media.

Respondents in our study exhibited an appreciation for test-enhanced learning in the form of podcast adjuncts: links to supplementary FOAMed resources, accompanying PDF/blog posts and test-orientated resources. The testing-effect is an educational technique proven to improve long-term retention by devoting periods of learning to test and recall [29,30]. The creators of future Southern African EM podcasts should, therefore, strongly consider the use of high-quality multimedia alongside consolidatory test-based resources.

A shorter podcast duration (5-15 minutes) was preferred for all content delivery-types. This contrasts with USA-based EM registrars who preferred longer podcasts (20-30 minutes), aligning with the global average EM podcast-length of 36.6 minutes [7,8]. The preference of our study participants for shorter podcasts may support their relative aversion toward didactic lectures, as the traditional length of faculty lectures is 45 minutes (Figure 3). Additionally, Southern African EM training programs may offer less time for podcast consumption, given the time pressure of service delivery in an overwhelmed public health system [31].

Another key finding for potential content-developers is the overwhelming popularity (90%) of the practice oral-exam format. Not only would these podcasts prove popular, but they would encourage more beneficial exam-focused learning among EM registrars [32,33].

Our study had similar limitations commonly associated with survey-methodology. This includes non-responder bias (respondents not using podcasts regularly being less likely to respond) and responder bias

(respondents who are regular and passionate podcast users being more likely to respond). Additionally, a certain level of computer literacy is required to complete an online survey, which could have resulted in an unmeasured access-barrier among non-responders. However, given our study's exploratory nature, coupled with our high response rate (75%), these limitations should not distract from the study results. Crucially, 74% of the survey responses were received before the implementation of the Covid-19 nationwide lockdowns in South Africa and Botswana [34–36]. While we surmise that the ongoing social-distancing measures may generate bias toward online education (including podcasts), the precise effect of this on our study's results cannot be known. However, this potential bias may inadvertently accentuate the identified significance of educational podcasts in the evolving landscape of medical education – catalysed by the ongoing Covid-19 pandemic.

Based on our study's findings, Southern African EM podcast developers should note the following:

- The preference of mobile devices for podcast-usage
- Using more video podcasts to engage Generation Y learners
- Context-specific podcast content to better align current teaching with clinical practice
- The appreciation of test-enhanced podcast adjuncts
- JiT learning as a useful but underappreciated means of medical education
- The popularity of shorter duration podcasts
- Repeat surveys to calibrate podcast characteristics to evolving contexts, technology and learning requirements

Conclusion

Podcast-usage proved to be near-ubiquitous among the studied Southern African EM registrars. Quintessentially, future context-specific podcast design should cater for mobile device-use, shorter duration podcasts, more video content, context-specific topics, and content optimised for both Just-in-Time Teaching, and test-enhanced learning.

Dissemination of results

Results from this study were shared with the program directors of the included training universities.

Authors' contributions

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: *KE contributed 65%, HL contributed 15%, WJ contributed 10% and VL, NC and AE contributed 5% each.*

All authors approved the version to be published and agree to be accountable for all aspects of the work.

Declaration of competing interest

The authors declare no conflicts of interest.

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References

[1] Hurst EJ. Podcasting in Medical Education and Health Care. J Hosp Librarianship 2019; 19:214–26. https://doi.org/10.1080/15323269.2019.1628564.

[2] Weston R, Crandall M, Ferrada P. Social Media and Free Open Access Medical (FOAM) Education. Curr Surg Reports 2019;7:4. https://doi.org/10.1007/s40137-019-0224-2.

[3] Cosimini MJ, Cho D, Liley F, Espinoza J. Podcasting in Medical Education: How Long Should an Educational Podcast Be? Journal of Graduate Medical Education 2017;9:388–9. https://doi.org/10.4300/jgme-d-17-00015.1.

[4] Berk J, Trivedi SP, Watto M, Williams P, Centor R. Medical Education Podcasts: Where We Are and Questions Unanswered. J Gen Intern Med 2020:1–3. https://doi.org/10.1007/s11606-019-05606-2.

[5] Abt G, Barry T. The Quantitative Effect of Students Using Podcasts in a First Year Undergraduate Exercise Physiology Module. Biosci Educ 2007;10:1–9. https://doi.org/10.3108/beej.10.8.

[6] Mallin M, Schlein S, Doctor S, Stroud S, Dawson M, Fix M. A survey of the current utilization of asynchronous education among emergency medicine residents in the United States. Academic Medicine : Journal of the Association of American Medical Colleges 2014;89:598–601. https://doi.org/10.1097/acm.0000000000000170.

[7] Little A, Hampton Z, Gronowski T, Meyer C, Kalnow A. Podcasting in Medicine: A Review of the Current Content by Specialty. Cureus 2020;12. https://doi.org/10.7759/cureus.6726.

[8] Riddell J, Swaminathan A, Lee M, Mohamed A, Rogers R, Rezaie SR. A Survey of Emergency Medicine Residents' Use of Educational Podcasts. West J Emerg Medicine 2017;18:229–34. https://doi.org/10.5811/westjem.2016.12.32850.

[9] Sandars J, teacher CMM, 2007. What is the Net Generation? The challenge for future medical education. Taylor & Francis n.d.

[10] Matava CT, Rosen D, Siu E, Bould DM. eLearning among Canadian anesthesia residents: a survey of podcast use and content needs. Bmc Med Educ 2013;13:59. https://doi.org/10.1186/1472-6920-13-59.

[11] She T, Shin-Kim J, Lee H, Li T, Steinberg E. Creating an Asynchronous Curriculum for Your Emergency Medicine Residency. MedEdPublish 2019;8:1–7. https://doi.org/10.15694/mep.2019.000090.1.

[12] Brown M. SOUTH AFRICAN PODCAST MEDIA CONSUMPTION RESEARCH DATA, TRENDS & ANALYSIS 2018 2018. http://www.mattbrownmedia.co.za/wp-content/uploads/2018/05/SA-Podcasting-Matt-Brown-Media-Research.pdf (accessed February 8, 2019).

[13] Thurtle N, Banks C, Cox M, Pain T, Furyk J. Free Open Access Medical Education resource knowledge and utilisation amongst Emergency Medicine trainees: A survey in four countries. African Journal of Emergency Medicine 2016;6:12–7. https://doi.org/10.1016/j.afjem.2015.10.005.

[14] Kleynhans AC, Oosthuizen AH, Hoving DJ van. Emergency medicine educational resource use in Cape Town: modern or traditional? Postgrad Med J 2016;93:250–5. https://doi.org/10.1136/postgradmedj-2016-134135.

[15] Matava CT, Rosen D, Siu E, Bould DM. eLearning among Canadian anesthesia residents: a survey of podcast use and content needs. Appendix 1. Survery Tool Bmc Med Educ 2013;13:59. https://doi.org/10.1186/1472-6920-13-59.

[16] CMSA. EXAMINATIONS GUIDELINES FOR CANDIDATES, EXAMINERS, CONVENORS AND MODERATORS FOR THE PART II EXAMINATION OF THE FELLOWSHIP OF THE COLLEGE OF EMERGENCY MEDICINE OF SOUTH AFRICA 2014. https://www.cmsa.co.za/view_exam.aspx?QualificationID=8 (accessed March 14, 2019).

[17] Chin A, Helman A, Chan T. Podcast Use in Undergraduate Medical Education. Cureus 2017;9:e1930. https://doi.org/10.7759/cureus.1930.

[18] Bahia K, Suardi S. The State of Mobile Internet Connectivity 2019. Global System for Mobile Communications Association; 2019.

[19] Purdy E, Thoma B, Bednarczyk J, Migneault D, Sherbino J. The use of free online educational resources by Canadian emergency medicine residents and program directors. CJEM 2015;17:101–6. https://doi.org/10.1017/cem.2014.73.

[20] Black A. Gen Y: Who They Are and How They Learn. JSTOR 2010;88:92–101.

[21] Riddell J, Robins L, Brown A, Sherbino J, Lin M, Ilgen JS. Independent and Interwoven: A Qualitative Exploration of Residents' Experiences With Educational Podcasts. Acad Med 2020;95:89–96. https://doi.org/10.1097/acm.0000000000002984.

[22] Helman, Anton. Effective Strategies in Emergency Medicine. Effective Strategies in Emergency Medicine Emergency Medicine Cases 2018. https://emergencymedicinecases.com/learning-strategies-emergency-medicine/ (accessed May 24, 2020).

[23] Rusyniak D, Greller H. The Dantastic Mr Tox & Howard n.d. https://podcasts.apple.com/us/podcast/the-dantastic-mr-tox-howard/id1247074688 (accessed May 8, 2020).

[24] Hoving DJ van, Hunter LD, Gerber R (Elre) J, Lategan HJ, Marks CJ. The burden of intentional self-poisoning on a district-level public Hospital in Cape Town, South Africa. Afr J Emerg Medicine 2018;8:79–83. https://doi.org/10.1016/j.afjem.2018.03.002.

[25] Hodkinson PW, James MFM, Wallis LA. Emergency department procedural sedation practice in Cape Town, South Africa. Int J Emerg Medicine 2009;2:91–7. https://doi.org/10.1007/s12245-009-0101-3.

[26] Meyer CC, Engelbrecht A. Procedural sedation and analgesia: Auditing the practice at Steve Biko Academic Hospital Emergency Centre from May to October 2014. Afr J Emerg Medicine 2015;5:108–13. https://doi.org/10.1016/j.afjem.2015.03.002.

[27] Mangum R, Lazar J, Rose MJ, Mahan JD, Reed S. Exploring the Value of Just-in-Time Teaching as a Supplemental Tool to Traditional Resident Education on a Busy Inpatient Pediatrics Rotation. Acad Pediatr 2017;17:589–92. https://doi.org/10.1016/j.acap.2017.04.021.

[28] Schuller MC, DaRosa DA, Crandall ML. Using just-in-time teaching and peer instruction in a residency program's core curriculum: enhancing satisfaction, engagement, and retention. Acad Medicine J Assoc Am Medical Coll 2015;90:384–91. https://doi.org/10.1097/acm.0000000000000578.

[29] Huffmyer JL, Nemergut EC. Test-Enhanced Learning in Flipped Classroom. Anesthesia & Analgesia 2015;121:589–90. https://doi.org/10.1213/ane.0000000000000662.

[30] Mayer RE. Applying the science of learning to medical education. Med Educ 2010;44:543–9. https://doi.org/10.1111/j.1365-2923.2010.03624.x.

[31] Maphumulo WT, Bhengu BR. Challenges of quality improvement in the healthcare of South Africa post-apartheid: A critical review. Curationis 2019;42:e1–9. https://doi.org/10.4102/curationis.v42i1.1901.

[32] Brown PC. Make it stick : the science of successful learning. Cambridge, Massachusetts : The Belknap Press of Harvard University Press, [2014]; 2014.

[33] Preston R, Gratani M, Owens K, Roche P, Zimanyi M, Malau-Aduli B. Exploring the Impact of Assessment on Medical Students' Learning. Assess Eval High Edu 2019;45:1–16. https://doi.org/10.1080/02602938.2019.1614145.

[34] BusinessTech. Ramaphosa announces 21 day coronavirus lockdown for South Africa 2020. https://businesstech.co.za/news/government/383927/ramaphosa-announces-21-day-coronavirus-lockdown-for-south-africa/ (accessed July 23, 2020).

[35] Africa C. Botswana ends COVID-19 lockdown 2020. https://africa.cgtn.com/2020/05/21/botswana-ends-covid-19-lockdown/ (accessed July 23, 2020).

[36] Mmegionline. Coronavirus: Botswana bans US, UK, China arrivals 2020. https://www.mmegi.bw/index.php?aid=84896&dir=2020/march/16 (accessed July 22, 2020).

List of Tables and Figures

Appendix. Survey

A Southern African Survey: Emergency Medicine podcast usage trends and requirements.

This survey is about medical podcast usage in Southern Africa among training emergency physicians. You have been selected as a potential respondent due to your affiliation with an emergency medicine training program in Southern Africa, to complete a short 5-minute survey.

Your response will be collected, de-identified, and utilised as a part of a research project and MMED dissertation with the potential for publication. You are not required to complete any personal contact details.

Should you agree to continue, kindly click on the link below to start the short survey.

You are free to leave any question(s) blank. The author's email addresses are provided below and at the end should you have any questions or queries about the survey.

Thank you for your participation in this survey.

Kind Regards,

Dr Kamlin Ekambaram

Emergency Medicine Registrar
University of Stellenbosch
kamlin.ekambaram@gmail.com

*Required

A Southern African Survey: Emergency Medicine podcast usage trends and requirements.

1. Are you currently working as an Emergency Medicine Registrar in Southern Africa? *

Question 1 of 18

Mark only one circle.

- Yes
- No

2. Please select your current year of training

Question 2 of 18

Mark only one circle.

- Year 1
- Year 2
- Year 3
- Year 4
- Other:

3. Please select your university

Question 3 of 18

Mark only one circle.

- University of Cape Town
- University of KwaZulu-Natal
- University of Stellenbosch
- University of Pretoria
- University of the Witwatersrand
- University of Botswana
- Other:

4. How many hours per week do you spend viewing or listening to medical podcasts?

Question 4 of 18

Mark only one circle.

- None
- < 1 hour per week
- 1-2 hours per week

- 2-4 hours per week
- >4 hours per week
- Other:

5. Please select the method(s) you use to review podcast materials

Question 5 of 18

Tick all that apply.

- ☐ Stream directly via desktop / laptop online
- ☐ Download on desktop / laptop for offline use
- ☐ Stream directly via a portable device (iPod/Mp3 player/smartphone/tablet)
- ☐ Download on a portable device (iPod/Mp3 player/smartphone/tablet) manually or automatically for offline use
- ☐ I do not review podcast material
- ☐ Other:

6. Which of the following best describes how you use medical podcasts? (Select all that apply)

Question 6 of 18

Tick all that apply.

- ☐ Review prior to a real-time case / procedure on shift
- ☐ Revision for exams
- ☐ As a part of your routine study
- ☐ Introduction of a new topic
- ☐ Post shift review
- ☐ I do not use medical podcasts
- ☐ Other:

7. Which of the following podcast format(s) best suits you?

Question 7 of 18

Tick all that apply.

- ☐ Audio only podcasts
- ☐ Multimedia podcasts (audio with still images or PowerPoint slides)
- ☐ Video podcasts
- ☐ Podcast with accompanying PDF / Blog posts
- ☐ Recorded faculty lectures
- ☐ I am not interested in Medical Podcasts

- ☐ Other:

8. If you do not use podcasts, which of the following reasons best explain(s) why not? (Select all that apply)

Question 8 of 18

Tick all that apply.

- ☐ I do not have access to an appropriate listening/viewing device(s)
- ☐ I do not have sufficient bandwidth or mobile data for streaming/downloading of podcasts
- ☐ I did not know they were available
- ☐ I am not used to accessing course material via podcast
- ☐ I do not like accessing course material via podcast
- ☐ I have experienced technical problems
- ☐ I do not have enough time to watch/listen to a podcast
- ☐ The quality of the information in podcasts is poor
- ☐ Current podcast content is not relevant to my practice
- ☐ Other:

9. How likely are you to listen to a context-specific Southern African Emergency Medicine podcast relevant to your work environment?

Question 9 of 18

Mark only one circle.

- ○ Extremely unlikely
- ○ Unlikely
- ○ Neutral
- ○ Likely
- ○ Extremely likely

10. Which of the following basic science/core knowledge topics would you like in a podcast?

Question 10 of 18

Tick all that apply.

- ☐ Clinical Anatomy
- ☐ Physiology
- ☐ Pathology
- ☐ Pharmacology
- ☐ Research Methods / Biostatistics

- ☐ None of the above
- ☐ Other:

11. Which of the following procedural topics would you like to see covered in a podcast?

Question 11 of 18

Tick all that apply.

- ☐ Basic critical care and resuscitation skills (e.g. Rapid sequence induction; airway management)
- ☐ Ultrasound-guided procedures
- ☐ Procedural analgesia sedation
- ☐ Basic orthopaedic skills (e.g. Fracture/dislocation management)
- ☐ Trauma resuscitation (e.g. Resuscitative thoracotomy; lateral canthotomy)
- ☐ Ventilator management
- ☐ None of the above
- ☐ Other:

12.

Which of the following Clinical topics would you like to see covered in a Podcast? (Select all that apply)

Question 12 of 18

Tick all that apply.

- ☐ Pre-hospital emergency
- ☐ Resuscitative problems and techniques
- ☐ Acute signs and symptoms in adults
- ☐ Acute signs and symptoms in children
- ☐ Emergency wound management
- ☐ Cardiovascular emergencies
- ☐ Pulmonary emergencies
- ☐ Gastrointestinal emergencies
- ☐ Renal and genito-urinary emergencies
- ☐ Gynaecological and obstetrical emergencies
- ☐ Infectious disease and allergy
- ☐ Toxicology
- ☐ None of the above
- ☐ Other:

13. Which of the following professional topics would you like to see covered in a podcast? (Select all that apply)

Question 13 of 18

Tick all that apply.

- ☐ Finance and wellbeing for Emergency Physicians
- ☐ Professionalism and ethics
- ☐ Patient safety in the Emergency Department
- ☐ Medico-legal issues
- ☐ Morbidity and Mortality in the Emergency Department
- ☐ Time Management
- ☐ Crisis Management
- ☐ Emergency Medicine in Resource-limited settings
- ☐ Organ Donation in the Emergency Department
- ☐ None of the above
- ☐ Other:

14. What is your preferred length for each of the following types of podcasts?

Question 14 of 18

Mark only one circle per row.

	< 5 mins	5 - 15 mins	15 - 30 mins	30 - 45 mins	> 45 mins
Recorded Didactic Lectures	○	○	○	○	○
Debates / Discussion	○	○	○	○	○
Journal Article reviews	○	○	○	○	○
Procedural Skills	○	○	○	○	○
Case Presentations	○	○	○	○	○
Recorded Didactic Lectures	○	○	○	○	○
Debates / Discussion	○	○	○	○	○
Journal Article reviews	○	○	○	○	○
Procedural Skills	○	○	○	○	○
Case Presentations	○	○	○	○	○

15. To what extent are you likely to stream or download the following podcast types of an acceptable length?

Question 15 of 18

Mark only one circle per row.

	Extremely Unlikely	Unlikely	Unsure	Likely	Extremely Likely
Recorded Didactic Lectures	○	○	○	○	○
Debates / Discussion	○	○	○	○	○
Journal Article reviews	○	○	○	○	○
Procedural Skills	○	○	○	○	○
Case Presentations	○	○	○	○	○
Practice Oral Exams	○	○	○	○	○
Recorded Didactic Lectures	○	○	○	○	○
Debates / Discussion	○	○	○	○	○
Journal Article reviews	○	○	○	○	○
Procedural Skills	○	○	○	○	○
Case Presentations	○	○	○	○	○
Practice Oral Exams	○	○	○	○	○

16. How often would you like a new podcast to be uploaded?

Question 16 of 18

Mark only one circle.

- Daily
- Once a week
- Twice a week
- Once a month
- Other:

17. Which of the following do you think is the most useful method to assist with knowledge retention from podcasts?

Question 17 of 18

Tick all that apply.

- Discussion Board posted alongside the podcast
- Links to other relevant FOAMed resources
- Pre and/or post podcast MCQs
- Rapid review clinical flash cards
- Opt-in email subscription with pearls and new episode updates
- None – podcasts alone are adequate
- Other:

18. Please enter any additional comments you would like to add about this survey or the study as a whole.

Part C: Supporting Documentation

A. Study Protocol

Title

An electronic survey of desired podcast format and content requirements among training Emergency Medicine specialists in South Africa.

Introduction

The age of overhead projector slides, didactic PowerPoint lectures and seminars is seemingly fading away. Newer technology and evidence into the science of learning is rapidly shaping medical education [1].

With the rise of social media, the FOAMed (Free open access medical education) bouquet has brought life to various methods of asynchronous learning. Blogs, twitter feeds, YouTube and Facebook are just a few examples of online media platforms where registrars consume medical education and actively participate in ongoing discussions. Social media is seen by many as a means to reduce the knowledge gap from published literature into practice [2].

Podcasts are recorded digital audio segments made available episodically for live streaming, or downloadable for later consumption [3]. They are an excellent source of medical education when compared to other methods of asynchronous and self-directed learning [1]. There is a significant and growing body of emergency medicine (EM) podcasts available. A survey of EM residents from training programs across the USA reported that over 88% listen to podcasts at least once a month, with the most popular reasons for podcast consumption reported as enabling listeners to “keep up with current literature” and “review core EM knowledge [4].” Interestingly, 70% of respondents reported changing their clinical practice based on podcast content.

Podcasts, as an e-learning tool, may be best suited to the current "millennial" cohort of South African emergency medicine trainees [5]. Kleynhans et al. reported that emergency medicine trainees in Cape Town under the age of 30 were more inclined to use social media as an educational resource [6]. Additionally, more than 50% of respondents reported accessing online multimedia more than once a month with YouTube (35%) and podcasts (21%) being the most common for educational purposes. She et al. suggested that the creation of an asynchronous curriculum is both feasible and effective for emergency medicine trainees [7].

This discrepancy between local and international educational podcast consumption has been previously attributed to lack of access, but research conducted by the team from the popular MATT BROWN SHOW podcast found that among the South Africans surveyed (n=15682), only 10.2% of respondents cited a lack of access (mobile data or bandwidth) as a barrier to consumption [8]. Although this study included all South Africans and entertainment podcasts, these findings are echoed by a recent article by Thurtle et al. that suggests that lack of awareness is the primary barrier to medical podcast usage in Botswana and Papua New Guinea [9].

A possible explanation for the difference in local podcast consumption trends despite growing popularity among South African EM doctors, is the lack of a context-specific South African EM podcast content. Only a handful of international podcasts include content relevant to the South African setting; however, these are infrequent and often from the perspective and interpretation of the podcast creator [10].

Finally, the effectiveness of a podcast as an educational medium has been linked with how well the content aligns with the listeners perceived needs [11]. Following this, it stands to reason that a podcast developed based on the content needs of South African emergency medicine trainees could both directly engage and benefit this audience.

Motivation

While the long-term benefits of a medical, educational podcast in South Africa are unclear, we cannot deny the growing popularity of this educational medium. This study aims to serve as a part of an internal project for the development and implementation of an educational South African emergency medicine podcast. This project is currently in its early development and this research project aims to guide it further. We hypothesis that South African emergency medicine registrars have specific and clear requirements for an educational podcast which may vary by level of seniority.

Study Aim

To explore the optimal content and format requirements for a South African Emergency Medicine Registrar-specific podcast by investigating current podcast usages trends and preferences among South African Emergency Medicine Registrars of varying levels of seniority.

Objectives

To survey South African EM registrars across the various training programs to analyse:

1. characteristics of an EM podcast:

1.1 content;

1.2 format;

1.3 preferred length,

2. current South African EM podcast usage:

2.1 trends;

2.2 indications;

2.3 user demographics (and non-user);

2.4 barriers to use,

3. differences in usage trends, content and format requirements:

3.1 among the various training programs;

3.2 Between levels of seniority.

Methods

This study is an e-Survey of South African EM registrars who train in South Africa.

Study Population

The study population includes between 80 and 90 EM registrars – this number varies at any given time as registrars are continually entering and exiting the various training programs. EM registrars are defined as doctors that are currently working as a Registrar in Emergency Medicine and are registered to complete the four year Masters of Medicine (MMED) programs offered by the following universities' Divisions of Emergency Medicine:

- The University of Cape Town;
- The University of Stellenbosch;
- The University of Witwatersrand;
- The University of KwaZulu-Natal;
- The University of Pretoria.

This study population not only encompasses a vast geographical and cultural group of registrars but also includes South African and International EM registrars from working in different provincial health systems across the country. International registrars are defined as non-South African, foreign qualified doctors that are registered to practice in South Africa as supernumerary registrars. We intend to compare the various groups to identify any significant difference in podcast needs with the ultimate aim of creating an educational podcast that serve the needs of the entire South African EM community.

Sampling

The sampling frame includes all the registered MMED in Emergency Medicine students throughout South Africa at the time of survey completion.

Survey Development

A similar study has been conducted on Canadian Anaesthesia residents by Matava et al.[11] in 2013. After obtaining permission from the Canadian authors, the survey tool was adapted to the South African Emergency Medicine context and using guidelines for self-administered surveys among clinicians [12,13]. Content questions where adapted and grouped from the current Faculty of the College of Emergency Medicine (FCEM) blueprint with professional topics included by the author [14]. The survey was then amended after review by an educationalist and emergency medicine specialist from the University of Stellenbosch and the University of Cape Town respectively who assessed for face and content validity.

Survey testing

The investigators pretested the survey. Pilot testing will be conducted on Cape Town emergency medicine registrar(s) during their academic rotation coinciding with the study period (typically one to two registrars), to assess for clarity and user-friendliness of the survey. Reponses from the pilot survey will be excluded from data analysis.

Survey Administration and Distribution

After all the relevant ethical and institutional approvals have been sought, we intend to contact the division heads of the various emergency medicine training programs across South Africa. After obtaining their consent, we will ask them to distribute the survey to their EM registrars for completion by a method(s) of their choosing. Reminders will be sent to the program directors a month apart for three months. Incomplete responses will be included in the data analysis.

Data Collection

After consenting to participation (consent process discussed later), respondents will be directed to the actual electronic survey. We will administer the survey via the personal, password protected, Google Forms (Google Inc.) account of the lead investigator. A hyperlink to the online survey will be provided to the relevant program directors.

Data Safety and Monitoring

During the data collection period, access to the database will be password protected under the personal account of the author. Data collected will be available only to the author(s).

Upon completion of data collection, we will print copies of the documents and store them in the dedicated, access-controlled research document locker at the division of Emergency Medicine offices. After hard copies of the data are safely and securely stored, the survey and the cloud database will be permanently deleted.

We will only capture the following demographic and identifying data: age, year of study, and program affiliation of the respondents.

No contact details of the participants will be asked for or stored.

At no point during the study will patient information be required or captured.

Data analysis

All data collected will be exported from Google Sheets into Microsoft Excel for analysis. We intend to analyse the data and compare perceived podcast content and trends between junior and senior registrars. We define junior registrar as year 1-2 and senior registrar as year 3 and above at the time of survey participation. Descriptive statistics will be used to summarise the categorical and a two-tailed Fishers exact test for the nominal data. A p-value of <= 0.05 is regarded as statistically significant.

The response rate calculation will be based on total eligible responders and will therefore include partially completed responses.

Time Schedule

TASK	TIME FRAME (MONTHS)
EMDRC	3
HREC	3
DATA COLLECTION	3-6
DATA MANAGEMENT	2
ANALYSIS AND REPORTING	2
WRITING	2
THE INITIAL SUBMISSION FOR PUBLICATION	2

Ethical Considerations

Description of risks and benefits

The risk to participants is presumed minimal. These include time spent to complete the survey and the possibility of social desirability bias. This survey, however, asks very few opinion questions, and thus unlikely to change existing views on the use of podcasts in medical education. A draft of the survey questions and design (Appendix A) developed by the authors is available for review.

As previously mentioned, all data will be kept and stored in an encrypting de-identified format.

Outcomes of this study will provide a more in-depth insight into the preferred learning practices of EM registrars and possibly the basis for educators to tailor new educational media to these preferences. It may also guide the development of a context-specific EM podcast in South Africa. Using the podcast medium for medical education and rapid distribution of new knowledge, and decrease the local knowledge translation gap, and disseminate pertinent new information.

Another potential benefit of this study is an insight into the use of self-administered electronic surveys for the development of context-specific podcast in other medical specialities in South Africa.

The email address of the author will be available at the end of the survey to address any unforeseen issues.

Autonomy and the Informed Consent process

A formal introductory information page with an opt-in consent checkpoint will greet participants upon opening the hyperlink distributed to them by the respective program directors. After agreeing to participate, respondents will be directed to the actual survey. Should participants decline consent, the survey will end and thank participants for their time - these will be considered as non-responders. Responders may at any time before analysis, withdraw from the study, and thus their results will not be included for analysis.

Privacy and Confidentiality

This study will not report on individual user preferences. It is possible that smaller training programs may be able to infer individual user responses from a sub-group analysis. Since the data represents only current preferences and usage and in no way tests current core knowledge or opinions, we do not anticipate this to be an issue.

Participants will not be contacted directly. Instead, program directors will be contacted and asked to disseminate the survey link to eligible participants.

Distributive Justice

This research project is intended as part of a larger FOAMed initiative which aims to provide free, accessible, medical education that is context specific with minimal barriers to access. Results from this project may also be used by educators for various purposes. While it is currently not the primary aim of this research project to actually create the FOAMed resource, should the data not accurately reflect the true needs of the target population, it is possible that it may misguide any projects based solely upon on the outcomes of this study.

Remuneration for participation

No remuneration will be awarded for participation.

We do not anticipate any emotional or physical research-related injuries during this study.

Limitations

Sample population - The population we aim to survey is small. We have limited the population to only those doctors currently working as emergency medicine specialist trainees and occupying an EM registrar post. Our results may not be generalisable to other junior doctors working in Emergency centres, Emergency Medicine Specialists and to MMED in EM students who are not in a Registrar post.

Response rate - Participation and response rates are always of concern with survey studies. This can introduce significant responder and non-responder bias.

Study design, data collection and data interpretation are not blinded. This lack of blinding may introduce bias and potentially invalidate some results.

Reporting and Implementation of results

We aim to publish the results of this study in a reputable and appropriate academic journal. We also intend to present study results as an abstract at local conferences. We will provide the respective heads of the various training programs involved with the results of the survey in publication format.

Resources

Available resources

Google Inc. provides a free to use online survey application tool registered to the author.

Personal computers used to capture, and process data are the property of the data collectors.

Budget

The study is self-funded.

EXPENSE	COST (ZAR)
TELEPHONE AND DATA	400.00
STATISTICAL SERVICE	0.00
STATIONERY AND PRINTING	0.00
GOOGLE FORMS	0.00
TOTAL COST	400.00

The motivation for expenses:

Telephone and data - To maintain direct contact with heads of department and data collectors. Bandwidth will be required for data capture and processing.

Acknowledgement(s)

We acknowledge Dr Clyde Matava, the principal investigator from "*eLearning among Canadian anesthesia residents: a survey of podcast use and content needs*" for permission to adapt and use their survey tool in our research.

References

[1] Mallin M, Schlein S, Doctor S, Stroud S, Dawson M, Fix M. A survey of the current utilization of asynchronous education among emergency medicine residents in the United States. *Acad Med*. 2014;89(4):598-601. doi:10.1097/ACM.0000000000000170.

[2] Scott KR, Hsu CH, Johnson NJ, Mamtani M, Conlon LW, DeRoos FJ. Integration of Social Media in Emergency Medicine Residency Curriculum. *YMEM*. 2014;64(4):396-404. doi:10.1016/j.annemergmed.2014.05.030.

[3] Cosimini MJ, Cho D, Liley F, Espinoza J. Podcasting in Medical Education: How Long Should an Educational Podcast Be? *Journal of Graduate Medical Education*. 2017;9(3):388-389. doi:10.4300/JGME-D-17-00015.1.

[4] Riddell J, Swaminathan A, Lee M, Mohamed A, Rogers R, Rezaie SR. A Survey of Emergency Medicine Residents' Use of Educational Podcasts. *WestJEM*. 2017;18(2):229-234. doi:10.5811/westjem.2016.12.32850.

[5] Sandars J, teacher CMM, 2007. What is the Net Generation? The challenge for future medical education. *Taylor & Francis*.

[6] Kleynhans AC, medical AOP, 2017. Emergency medicine educational resource use in Cape Town: modern or traditional? *pmjbmjcom*.

[7] She T, Shin-Kim J, Lee H, Li T, Steinberg E. Creating an Asynchronous Curriculum for Your Emergency Medicine Residency. *MedEdPublish*. 2019;8(2):1-7. doi:10.15694/mep.2019.000090.1.

[8] Brown M. SOUTH AFRICAN PODCAST MEDIA CONSUMPTION RESEARCH DATA, TRENDS & ANALYSIS 2018. In:; 2018:1-28. http://www.mattbrownmedia.co.za/wp-content/uploads/2018/05/SA-Podcasting-Matt-Brown-Media-Research.pdf.

[9] Thurtle N, Banks C, Cox M, Pain T, Furyk J. Free Open Access Medical Education resource knowledge and utilisation amongst Emergency Medicine trainees: A survey in four countries. *African Journal of Emergency Medicine*. 2016;6(1):12-17. doi:10.1016/j.afjem.2015.10.005.

[10] Cattermole GN, Manirafasha A, Aluisio AR. Freely Accessible Medical Education (FAME) for Africa. *African Journal of Emergency Medicine*. 2018;8(2):41-42. doi:10.1016/j.afjem.2018.05.003.

[11] Matava CT, Rosen D, Siu E, Bould DM. eLearning among Canadian anesthesia residents: a survey of podcast use and content needs. 2013;13(1):59.

[12] Matava C. *Microsoft Word - Appendix 1 Survey Tool.Docx*. 2012:1-5.

[13] Burns K, Duffett M, Kho ME, Medical MMC, 2008. A guide for the design and conduct of self-administered surveys of clinicians. *Can Med Assoc*. 2008;179(3):245-252. doi:10.1503/cmaj.080372.

[14] CMSA. *Examinations Guidelines for Candidates, Examiners, Convenors and Moderators for the Part II Examination of the Fellowship of the College of Emergency Medicine of South Africa*. Johannesberg: The Colleges of Medicine of South Africa NPC; 2014:1-40.

Appendix. Draft Survey

A Nationwide Survey: South African Emergency Medicine podcast usage trends and requirements.

This survey is about medical podcast usage in South Africa among training emergency physicians.
You have been selected as a potential respondent due to your affiliation with an emergency medicine training program in South Africa, to complete a short 5-minute survey.
Your response will be collected, de-identified, and utilised as a part of a research project and MMED dissertation with the potential for publication. You are not required to complete any personal contact details.
Should you agree to continue, kindly click on the link below to start the short survey.
You are free to leave any question blank. The authors' email addresses are provided below and at the end should you have any questions or queries about the survey.
[Hyperlink to Google Docs]
Thank you for your participation in this survey
Kind Regards,

Dr Kamlin Ekambaram
Emergency Medicine Registrar
University of Stellenbosch
kamlin.ekambaram@gmail.com

Q1: Are you currently working as an Emergency Medicine Registrar in South Africa?

Yes

No

Q2: Please select your current year of training?

One

Two

Three

Four

Other: _____

Q3: Please select your University

University of Cape Town

University of KwaZulu-Natal

University of Stellenbosch

University of Pretoria

University of Witswaterand

Q4: How many hours per week do you spend viewing or listening to medical podcasts?

None

< 1 hour per week

1-2 hours per week

2-4 hours per week

>4 hours per week

Q5: Please select the method(s) you use to review podcast materials:

Stream directly via desktop / laptop online

Download on desktop / laptop for later offline use

Stream directly via portable device (iPod/Mp3 player/smartphone/tablet)

Download on portable device (iPod/Mp3 player/smartphone/tablet) manually or automatically for later offline use

I do not review podcast material

Other: _____

Q6: Which of the following best describes how you use medical podcasts? (Select all that apply)

Review prior to realtime case / procedure on shift

Revision for exam

Part your routine study

Introduction of new topic

Post shift review

I do not use medical podcasts

Other: _____

Q7: Which of the following podcast format(s) best suits you?

Audio podcasts

Multimedia podcasts (audio with still images or powerpoint slides)

Video podcasts

Podcast with accompanying PDF / Blog posts

Recorded faculty lectures

I am not interested in Medical Podcasts

Other: _____

Q8: If you do not use podcasts, which of the following reasons best explain(s) why not? (Select all that apply)

I do not have access to an appropriate listening/viewing device.

I do not have sufficient bandwidth or mobile data for streaming/downloading of podcasts

I did not know they were available

I am not used to accessing course materials via podcast.

I do not like accessing course materials via podcast.

I have experienced technical problems

I do not have enough time to watch/listen to a podcast

The quality of the information in the podcasts is poor

Current podcast content is not relevant to my practice

Other _____

Q9: How likely are you to listen to a context-specific South African Emergency Medicine Podcast relevant to your work environment?

Extremely unlikely

Unlikely

Neutral

Likely

Extremely likely

Q10: Which of the following **basic science/core knowledg**e topics would you like in a Podcast?

Clinical Anatomy

Physiology

Pathology

Pharmacology

Research Methods / Biostatistics

None of the above

Other: _____

Q11: Which of the following **procedural** topics would you like to see covered in a Podcast?

Basic critical care and resuscitation skills, e.g. Rapid sequence induction, and airway management

Ultrasound-guided procedures

Procedural analgesia sedation

Basic orthopaedic skills, e.g. Fracture/dislocation management

Trauma resuscitation, e.g. Resuscitative thoracotomy, lateral canthotomy

Ventilator management

None of the above

Other: _____

Q12: Which of the following **Clinical** topics would you like to see covered in a Podcast? Select all that apply

Pre-hospital emergency

Resuscitative problems and techniques

Acute signs and symptoms in adults

Acute signs and symptoms in children

Emergency wound management

Cardiovascular emergencies

Pulmonary emergencies

Gastrointestinal emergencies

Renal and genito-urinary emergencies

Gynaecological and obstetrical emergencie

Infectious disease and allergy

Toxicology

None of the above

Other: _____

Q13: Which of the following **professional** topics would you like to see covered in a Podcast? Select all that apply

Finance and wellbeing for Emergency Physicians

Professionalism and ethics

Patient safety in the Emergency Department

Medico-legal issues

Mortality and Morbidity in the Emergency Department

Time Management

Crisis Management

Emergency Medicine in Resource-limited settings

Organ Donation in the Emergency Department

None of the above

Other: _____

Q14: What is your preferred **length** for each of the following types of podcasts?

	<5 MINS	5-15 MINS	15 - 30 MINS	30 - 45 MINS	> 45 MINS
RECORDED DIDACTIC LECTURES	o	o	o	o	o
DEBATES/DISCUSSION	o	o	o	o	o
JOURNAL ARTICLE SUMMARIES	o	o	o	o	o
PROCEDURAL SKILLS	o	o	o	o	o
CASE PRESENTATIONS	o	o	o	o	o

Q15: To what extent are you likely to stream, download or view online the following podcast **types** of an acceptable length?

	EXTREMELY UNLIKELY	UNLIKELY	DO NOT KNOW	LIKELY	EXTREMELY LIKELY
RECORDED DIDACTIC LECTURES	o	o	o	o	o
DEBATES/DISCUSSION	o	o	o	o	o
JOURNAL ARTICLE SUMMARIES	o	o	o	o	o
PROCEDURAL SKILLS	o	o	o	o	o
CASE PRESENTATIONS	o	o	o	o	o
PRACTICE ORAL EXAM	o	o	o	o	o

Q16: How often would you like a new podcast to be uploaded?

Daily

Weekly

Biweekly

Monthly

Other: _____

Q17: Which of the following do you think is the most useful method to assist with knowledge retention from Podcasts?

Discussion Board posted alongside podcast

Links to other relevant FOAMed resources

Pre and post MCQ's

Rapid review clinical flash cards

Opt-in email subscription with Pearls and new episode updates

None – podcasts alone are adequate

Other: _____

Q18: Please enter any additional comments you would like to add about this survey or the study as a whole

_____

_____

Thank you for your participation in this survey

Please click the submit button to complete the survey.

Kind Regards,

Dr Kamlin Ekambaram

Emergency Medicine Registrar

University of Stellenbosch

kamlin.ekambaram@gmail.com

B. Health Ethics Review Committee Approval

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY

Approved with Stipulations

New Application

12/12/2019

Project ID: 11419

HREC Reference No: S19/09/194

Project Title: An electronic survey of desired podcast format and content requirements among training Emergency Medicine specialists in South Africa

Dear Dr Kamlin Ekambaram

The **New Application** received on 08/10/2019 was reviewed by members of the **Health Research Ethics Committee** via Minimal Risk Review procedures on 12/12/2019 and was **approved with a stipulation.**

Please note the following information about your approved research protocol:

Approval date: 12 December 2019

Expiry date:11 December 2020

The stipulation of your ethics approval are as follows:

Please upload approval from the SU Division for Institutional Research and Planning when obtained

Please remember to use your project ID 11419 and ethics reference number S19/09/194 on any documents or correspondence with the HREC/UREC concerning your research protocol.

Translation of the consent document(s) to the language(s) applicable to your study participants should now be submitted to the HREC.

Please note that this decision will be ratified at the next HREC full committee meeting. HREC reserves the right to suspend approval and to request changes or clarifications from applicants. The coordinator will notify the applicant (and if applicable, the supervisor) of the changes or suspension within 1 day of receiving the notice of suspension from HREC. HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note you can submit your progress report through the online ethics application process, available at: https://apply.ethics.sun.ac.za and the application should be submitted to the Committee before the year has expired. Please see Forms and Instructions on our HREC website for guidance on how to submit a progress report.

The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility, permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Please consult the Western Cape Government website for access to the online Health Research Approval Process, see: https://www.westerncape.gov.za/general-publication/health-research-approval-process. Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and instructions, please visit: Forms and Instructions on our HREC website (www.sun.ac.za/healthresearchethics)

If you have any questions or need further assistance, please contact the HREC office at 021 938 9677.

Yours sincerely,

Mrs. Melody Shana

Coordinator

HREC1

National Health Research Ethics Council (NHREC) Registration Number:

REC-130408-012 (HREC1)•REC-230208-010 (HREC2)

Federal Wide Assurance Number: 00001372
Office of Human Research Protections (OHRP) Institutional Review Board (IRB) Number:
IRB0005240 (HREC1)•IRB0005239 (HREC2)

*The Health Research Ethics Committee (HREC) complies with the SA National Health Act No. 61 of 2003 as it pertains to health research. The HREC abides by the ethical norms and principles for research, established by the*World Medical Association (2013). Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects*;the South African* Department of Health (2006). Guidelines for Good Practice in the Conduct of Clinical Trials with Human Participants in South Africa (2nd edition); as well as the Department of Health (2015). Ethics in Health Research: Principles, Processes and Structures (2nd edition).

The Health Research Ethics Committee reviews research involving human subjects conducted or supported by the Department of Health and Human Services, or other federal departments or agencies that apply the Federal Policy for the Protection of Human Subjects to such research (United States Code of Federal Regulations Title 45 Part 46); and/or clinical investigations regulated by the Food and Drug Administration (FDA) of the Department of Health and Human Services.

C. Author Guidance: African Journal of Emergency Medicine

The author guidelines for the *African Journal of Emergency Medicine* can be found at (accessed 10 September 2020):

Web link: https://www.elsevier.com/journals/african-journal-of-emergency-medicine/2211-419x/guide-for-authors

Direct PDF-link:

http://www.elsevier.com/wps/find/journaldescription.cws_home/725742?generatepdf=true

AFRICAN JOURNAL OF EMERGENCY MEDICINE

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DESCRIPTION

AUTHOR INFORMATION PACK

ISSN: 2211-419X

The *African Journal of Emergency Medicine* (*AfJEM*) is the official journal of the African Federation for Emergency Medicine. It is an Africa-centric, peer-reviewed journal aimed in particular at supporting emergency care across, you guessed it, Africa. *AfJEM* publishes original research, reviews, brief reports of scientific investigations, case reports as well as commentary and correspondence related to topics of scientific, ethical, social and economic importance to emergency care in Africa. Articles will be of direct importance to African emergency care, but may have originated from elsewhere in the world.

AfJEM publishes manuscripts of international quality. This is ensured through a process of rigorous peer-review (see below) where manuscripts are evaluated for accuracy, novelty and importance. It is however recognised that African researchers in emergency care are disadvantaged in the available range of journals into which they can publish their work. The editorial team is aware that this is due to many reasons, including that developing world topics are often considered too basic for western Emergency Medicine journals, or that topics are concerned with conditions which are largely irrelevant to those audiences. Furthermore, the quality of submitted manuscripts is often lower than acceptable international journal standards due to inadequate research training. *AfJEM* is dedicated to support all authors who wish to make an attempt at publication on an African Emergency care topic. In order to maintain and produce a high quality, international standard Emergency Medicine journal, *AfJEM* has devised *Author Assist*. For more detail go to http://www.afjem.com/author-assist.html.

AfJEM is uniquely tailored to the needs and requirements of emergency care workers dedicated to improving emergency medicine in Africa. *AfJEM* specifically aims to address resource limitations as it pertains to the African continent. It will be ideal reading material for physicians, nurses and pre- hospital care workers wishing to improve their knowledge on general emergency medicine, trauma care, paediatrics, injury and disease prevention, service improvement, policy and ethics, disaster preparedness and response, and all other aspects of emergency care. In keeping with the African Federation for Emergency Medicine, it is our aim to be recognised as the international voice of quality emergency medical care in Africa.

ABSTRACTING AND INDEXING

PubMed Central
Scopus
EBSCOhost
Embase
Emerging Sources Citation Index (ESCI)
Directory of Open Access Journals (DOAJ)
South African Department of Higher Education and Technology African Index Medicus

EDITORIAL BOARD

GUIDE FOR AUTHORS

INTRODUCTION

The African Journal of Emergency Medicine (AfJEM, ISSN: 2211-419X) is the official journal of the African Federation for Emergency Medicine. It is an international, peer-reviewed journal aimed in particular at supporting emergency care across Africa. AfJEM publishes original research, reviews, brief reports of scientific investigations, case reports as well as commentary and correspondence related to topics of scientific, ethical, social and economic importance to emergency care in Africa. Articles will be of direct importance to African emergency care, but may have originated from elsewhere in the world.

TYPES OF ARTICLES

Original Article: Original studies of basic or clinical investigations in areas relevant to emergency medicine. Reference to the relevance of the research in a resource poor setting is essential and should be alluded to in the discussion section. References and a structured abstract (see Preparation below) are required. Maximum length: 3,000 words, 5 tables and/or figures, plus the abstract (300 words) and references (max 50). The checklists found on the following websites should be used to structure your manuscript (a copy of the checklist indicating which elements of the reporting format you adhered to, a signed conflict of interest form - see below- should be submitted with your manuscript):

a. For randomised control trials: http://www.consort-statement.org
b. For cohort, case-control, and cross-sectional studies: http://www.strobe-statement.org/ c. All other studies: http://www.equator-network.org/

2. *Review Articles*: Extensive reviews of the literature on a narrow clinical topic. References must include, but need not be limited to, the past 3 years of the literature. A structured abstract is required (see Preparation below). Maximum length: 3,000 words, plus the abstract (max 300 words) and references (max 50). **Please contact the editor in chief before you submit a review.** The following reporting checklists should be used to structure your manuscript (a copy of the checklist indicating which elements of the reporting format you adhered to, a signed conflict of interest form - see below- should be submitted with your manuscript):

a. A Resourced-tiered review checklist is the standard reporting format for publication in AfJEM:

http://www.afjem.com/resource-tiered-checklist.html

b. If your topic does not lean itself towards a resourced tiered review consider alternative reporting checklists for systematic reviews and meta-analyses such as Prisma checklist (http://www.prisma-statement.org) or similar. **Please check with the editor-in-chief before using a checklist other that the resources-tiered checklist.**

3. *Case Reports*: Brief descriptions of a previously undocumented disease process, a unique unreported manifestation or treatment of a known disease process, or unique unreported complications of treatment regimens. Case reports should be structured as follow: Introduction, Case report and Discussion. It should not contain an exhaustive review of the literature. Consider consent for patient identifiable information (download from website). A structured abstract (see Preparation below) is required. Maximum length: 1,000 words, plus abstract (max 150 words) and references (max 10), and 1 table or figure a copy of the checklist indicating which elements of the reporting format you adhered to, a signed conflict of interest form - see below- should be submitted with your manuscript). Case reports listed for publication after 2015 are published online only and compiled within a virtual issue once a year.

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